

# **UHA-Series Tubular Unit Heaters (Standard Range) Installation, Operation & Service Manual**

**Models UHA[S]  
150, 175, 200, 225  
250, 300, 350, 400**



## **FOR YOUR SAFETY**

*If you smell gas:*

1. Open windows.
2. **DO NOT** try to light any appliance.
3. **DO NOT** use electrical switches.
4. **DO NOT** use any telephone in your building.
5. Leave the building.
6. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
7. If you cannot reach your gas supplier, call the Fire Department.

## **⚠ WARNING**



### **Fire Hazard**

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury or property damage.

## **⚠ WARNING**

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the Installation, Operation and Service Manual thoroughly before installing or servicing this equipment.

Installation must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

### **Installer**

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

### **Owner**

Keep this manual in a safe place in order to provide your serviceman with necessary information.



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## SECTION 1: HEATER SAFETY



Your Safety is Important to Us!  
This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, Service and Annual Inspection of heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation or service of this equipment.

Heaters are not approved for residential installation. These instructions, the layout drawing, local codes and ordinances and applicable standards that apply to gas piping, electrical wiring, venting, etc. must be thoroughly understood before proceeding with the installation.

Thin sheet metal parts, including the various venting components, have sharp edges. To prevent injury, the use of work gloves is recommended.

Before installation, check that the local distribution conditions, nature of gas and pressure and adjustment of the appliance are compatible.

### 1.1 Manpower Requirements

To prevent personal injury and damage to the heater, two persons will be required for installation.

## SECTION 2: INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Rapid Engineering recommends the installer contact a Local Building Inspector or Fire Marshal for guidance.
- To use the information given in a layout drawing and in the manual together with the cited codes and regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports, vents and air intakes.
- To provide access for servicing.
- To provide the owner with a copy of this Installation, Operation and Service Manual.
- To never use heater as support for a ladder or other access equipment and never hang or suspend anything from heater.
- To ensure there is adequate air circulation around the heater and to supply air for combustion, ventilation and distribution in accordance with local codes.

### 2.1 Wall Tag

A laminated wall tag is included with the heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Affix the tag by peeling off the backing of the adhesive strips on the rear surface and position the tag on a wall near the heater.

A copy of the wall tag (P/N 91040033) is illustrated on the back cover.

Know your model number. Model number is found on the heater and in the Installation, Operation and Service Manual. See *Page 9, Figure 3 through Page 14, Figure 9*.

### 2.2 Corrosive Chemicals

#### CAUTION

**Do not use heater in an area containing corrosive chemicals.**

**Avoid the use of corrosive chemicals to ensure a longer life of the burner, heat exchanger and other parts.**

**Failure to follow these instructions can result in property damage.**

Rapid Engineering cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons\* anywhere in the premises.

*\* **Halogenated Hydrocarbons** are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the life span of the heater components will be greatly reduced. An outside air supply must be provided to the burners whenever the presence of these compounds is suspected. Warranty will be invalid if the heater is exposed to halogenated hydrocarbons.*

### 2.3 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of the applicable standards and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in public garages, aircraft hangars, etc. may be applicable.



## SECTION 3: CRITICAL CONSIDERATIONS

### 3.1 Basic Information

UHA[S] heaters have automatic ignition burners for ON/OFF operation only.

### 3.2 Location and Suspension

All models:

- Must be installed indoors.
- Must be installed in a level position with horizontal discharge.
- May be mounted on a shelf of non-combustible material.
- May be suspended from above (*See Page 6, Figure 2*) or from wall brackets of sufficient strength to support the heater as listed in the Dimension Data Table on *Page 38, Section 15.1*. Drop rods must be a minimum of 3/8" diameter mild steel. Four suspension points (3/8" nuts) are located on top of the heater.
- Must be installed in a manner which allows access to all serviceable components. *See Page 4, Figure 1* for details.

### 3.3 Minimum Required Installation Clearances

Clearances around the heater and vent must be as indicated on *Page 4, Figure 1; Page 9, Figure 3 through Page 12, Figure 8* to ensure access for servicing, and correct operation.

### 3.4 Clearances to Combustibles

Clearances must be as indicated on *Page 4, Figure 1*. If clearances to combustibles are not indicated, then installation clearances apply.

### 3.5 Ventilation

It is important to ensure that there is adequate air space around the heater to supply air for combustion, ventilation and distribution in accordance with local and national codes on *Page 7, Section 6*.

### 3.6 Gas Supply

It is important that the gas supply pipe is sized correctly to provide the inlet pressure as stated on the heater data plate. The gas supply pipe and electrical connections must not support any of the heater's weight on *Page 14, Section 8*.

### 3.7 Electrical Supply

A permanent 120 V 60 Hz 1 Ø electrical supply is required for the main electrical power. The heater also requires suitable controls in accordance with *See Page 15, Section 9*.

### 3.8 Vent

Choose heater orientation to allow for the proper location of the vent. Each heater must be fitted with a correctly sized sealed vent system.

If vented horizontally, no other appliance may be connected to the vent. *See Page 7, Section 6*.

### 3.9 Separated Combustion Installation

For separated combustion installation, the vent and air intake must be fitted with an individual and correctly sized sealed system and the vent and air intake must terminate at approved wall and roof terminals.

Separated combustion units may not be common vented. *See Page 7, Section 6*.

**Installation Clearances**

Roof Terminal

(Optional separated combustion concentric venting shown.)

Top

10' (3 m)

24" for adequate air flow access axial fan.

20' (6.0 m) - 30' (9.1 m)  
Max. Mounting Height\*

Wall Terminal

\* Recommended mounting height varies with heater input. Heaters may be mounted at a higher level if destratification fans are installed.

Note: Venting directly from top of heater not applicable on Models 150 - 400.

**Clearances to Combustibles**

6" (15 cm)

6" (15 cm)

31" (79 cm)

3" (79 cm)

Clearance to Vent: 2" (5 cm)

\*\*31" (79 cm) minimum is necessary for servicing.

The heater must always be installed at least 6' (2 m) above the floor.

The vent pipe must have clearance from combustibles by 2" (5 cm).

If installed at low levels where individuals can come in contact with hot heat exchanger components, adequate guarding must be provided.

**SECTION 4: NATIONAL STANDARDS AND APPLICABLE CODES****4.1 Gas Codes**

The type of gas appearing on the name plate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.

United States: Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1 Natural Gas and Propane Installation Code.

**4.2 Aircraft Hangars**

Installation in aircraft hangars must be in accordance with the following codes:

United States: Refer to Standard for Aircraft Hangars, NFPA 409 - latest revision.

Canada: Refer to Standard CSA B149.1 Natural Gas and Propane Installation Code.

- In aircraft storage and servicing areas, heaters shall be installed at least 10' (3 m) above the upper surface of wings or of engine enclosures of the highest aircraft which may be housed in the hangar. The measurement shall be made from the wing or engine enclosure (whichever is higher from the floor) to the bottom of the heater.
- In shops, offices and other sections of aircraft hangars communicating with aircraft storage or servicing areas, heaters shall be installed not less than 8' (2.4 m) above the floor.
- Suspended or elevated heaters shall be so located in all spaces of aircraft hangars that they shall not be subject to injury by aircraft, cranes, movable scaffolding or other objects. Provisions shall be made to assure accessibility to suspended heaters for recurrent maintenance purposes.

**4.3 Parking Structures and Repair Garages**

Installation in garages must be in accordance with the following codes:

United States: Standard for Parking Structures NFPA 88A - latest revision or the Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A - latest revision. Canada: Refer to CSA B149.1 Natural Gas and Propane Installation Code.

- In accordance with the Standard for Parking Structures NFPA 88A, heaters must be located a minimum of 18" (50 cm) below the floor-ceiling assembly or 18" (50 cm) above the floor.
- In accordance with the Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A - latest revision, heaters must not be installed less than 8' (2.4 m) above the floor.

**4.4 Electrical**

The heater must be electrically grounded in accordance with the following codes:

United States: Refer to National Electrical Code®, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code®, local ordinances and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

**4.5 Venting**

The venting must be installed in accordance with the requirements within this manual and the following codes:

United States: Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1 Natural Gas and Propane Installation Code.

**4.6 High Altitude**

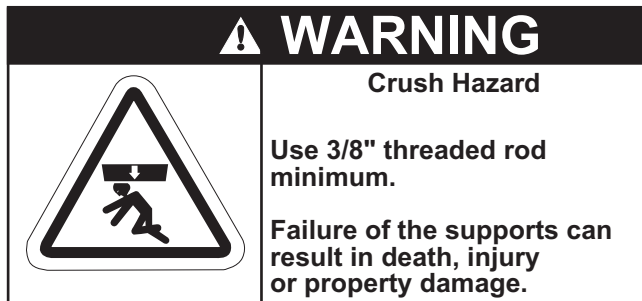
These heaters are approved for installations up to 2000' (610 m). In USA, consult factory if heater is to be installed above 2000' (610 m). In Canada, high altitude conversion kits are available for installations up to 4500' (1370 m). Installations above 4500' (1370 m) in Canada is by local or provincial authority.

## SECTION 5: MAJOR COMPONENTS

### 5.1 General

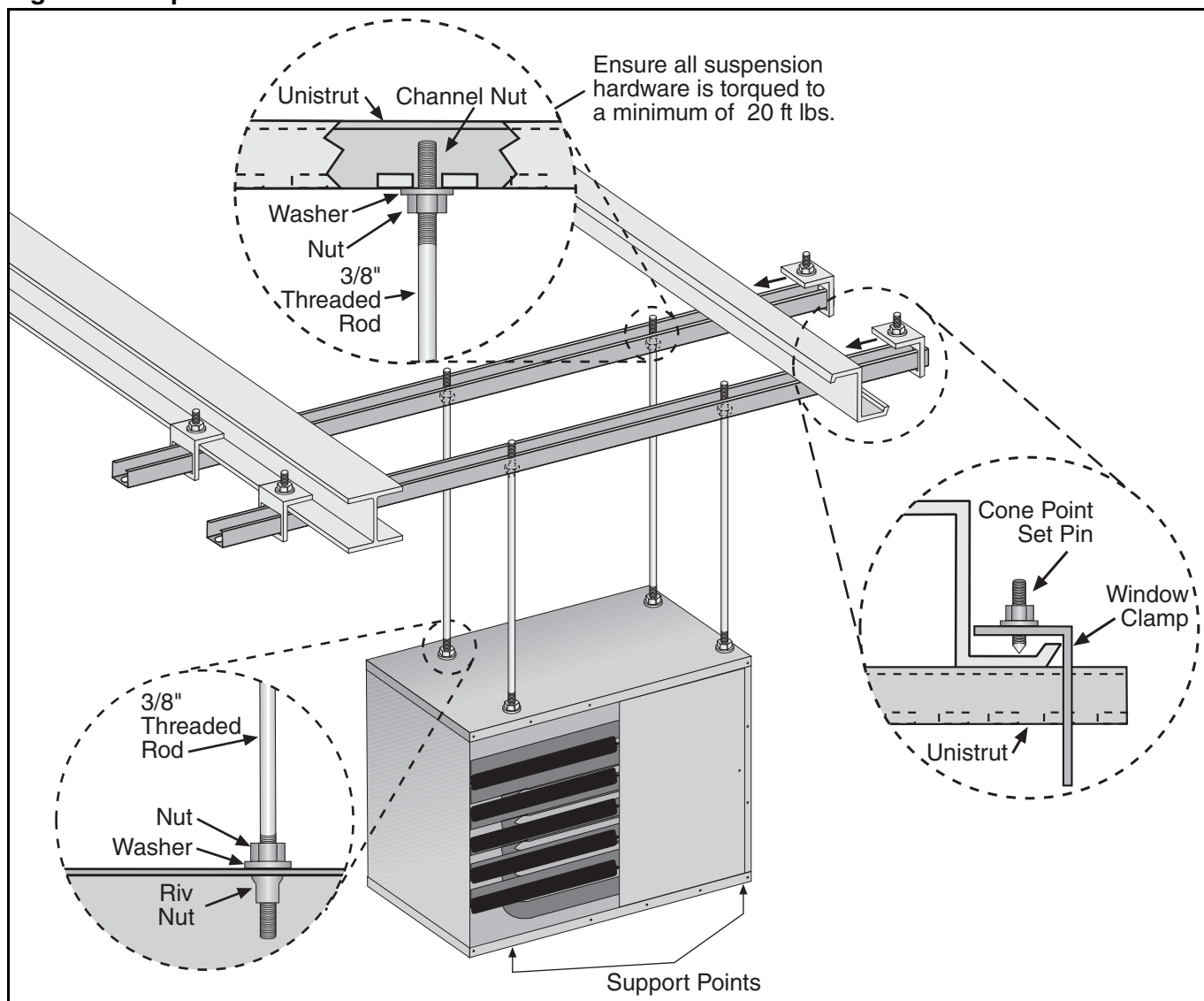
Heaters are designed for installation above 6' (1.8 m). These heaters must be installed within the heated space. Duct delivery systems are not permitted with axial fan units. When handling or supporting the heater from below, ensure that the weight is taken at the support points.

### 5.2 Suspension



For typical suspension, See Page 6, Figure 2.

**Figure 2: Suspension Methods**



## SECTION 6: VENTING

### 6.1 Venting

This heater must be vented in accordance with the rules contained in this manual and with the following national codes and any state, provincial or local codes which may apply: **United States:** Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code; **Canada:** Refer to CSA B149.1 Natural Gas and Propane Installation Code. Any portion of vent pipe passing through a combustible wall must have a listed thimble to conform with the above codes.

The heater may be installed unvented in certain circumstances according to building ventilation codes. Refer to the above codes *and Page 8, Section 6.3* for further information. Unvented operation also requires compliance with the clearances to combustibles given *on Page 4, Figure 1*.

The bottom of the vent or air intake terminal shall not be located less than 1' (.3 m) above grade level.

The vent shall not terminate less than 7' (2.1 m) above grade where located adjacent to public walkways.

Vent terminal must be installed at a height sufficient to prevent blockage by snow and building materials protected from degradation by flue gasses.

Vent terminal must be beyond any combustible overhang.

Secure all joints with corrosion resistant #8 x 3/8" sheet metal screws.

For single wall venting, pressure sensitive aluminum tape or silicone sealant must be used to seal all joints.

Aluminum tape shall have a minimum temperature rating of 400° F (204° C) and meet SMACNA AFTS-100-73 standards. High temperature silicone sealant must have a minimum temperature rating of 480° F (250° C).

#### 6.1.1 United States Requirements

Vent must terminate at least 3' (.9 m) above any forced air inlet located within 10' (3.1 m).

Vent must terminate at least 4' (1.2 m) below, 4' (1.2 m) horizontally from, or 1' (.3 m) above any door, operable window, or gravity air inlet into any building.

NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code specifies a 4' (1.2 m) horizontal vent terminal clearance from gas and electric meters, regulators and relief equipment.

### 6.1.2 Canadian Requirements

The vent shall not terminate within 6' (1.8 m) of a mechanical air supply inlet to any building.

The vent shall not terminate within 3' (.9 m) of a window or door that can be opened in any building, any non-mechanical air supply inlet to any building, or of the combustion air inlet of any other appliance.

### 6.2 Vent Installation

 <b>WARNING</b>

<b>Fire Hazard</b>
<p>Some objects will catch fire or explode when placed close to heater.</p>
<p>Keep all flammable objects, liquids and vapors the required clearances to combustibles away from heater.</p>
<p>Failure to follow these instructions can result in death, injury or property damage.</p>

For vented units, the vent must terminate outside of the building.

Vents must be fully sealed and correctly sized for the model. If the vent passes through a wall or ceiling of combustible material, it must be enclosed by a listed thimble and be separated from the thimble by at least a 2" (5 cm) air gap.

For separated combustion models, vents and air intakes must be a fully sealed system and correctly sized for the model. Vent should be assembled as detailed *on Page 9, Figure 3 through Page 12, Figure 8*. The joints between the vent terminal and the roof or wall must be properly sealed. If the vent passes through a wall or ceiling of combustible material, it must be enclosed by a listed thimble and be separated from the thimble by at least a 2" (5 cm) air gap.

**Vents and air intakes must be adequately supported so that the heater does not bear the weight of the pipes.**

For vent termination See *Page 9, Figure 3 through Page 12, Figure 8*.



#### 6.2.1 Standard Vented Heaters (Models UHA 150 - 400)

The vent must be fitted with a low resistance terminal. See *Page 9, Figure 3 through Page 9, Figure 4*. Standard vented heaters do not allow outdoor air intake for combustion air.

### 6.2.2 Separated Combustion Heaters (Models UHAS 150 - 400)

The heaters are designed to be installed as separated combustion heaters. The vent and air intake are run as separate pipes to the wall or roof terminals. See Page 12, Figure 8. As an option, the vent and air intake are run as separate pipes to a concentric vent box and a concentric vent/air intake pipe penetrates the wall or roof.

### 6.3 Unvented Operation

 <b>WARNING</b>	
	<b>Carbon Monoxide Hazard</b> <b>Heaters installed unvented must be interlocked with sufficient building exhaust.</b>
	<b>Heaters must be installed according to the installation manual.</b>
	<b>Failure to follow these instructions can result in death or injury.</b>

For unvented operation in commercial installations, sufficient ventilation must be provided in the amount of 4 cfm per 1000 Btu/h firing rate (United States); 3 cfm per 1000 Btu/h firing rate (Canada).

**WARNING:** Combustion by-products contain a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

### 6.4 Horizontal Venting

Horizontally vented heaters must be individually vented.

Vent pipe must be sloped 1/4" (.6 cm) for every 1' (.3 m). For vent lengths greater than 5' (1.5 m), condensation will form. Insulation is recommended and condensation drains may be desired. For vents pitched up toward the vent terminal, place the condensation drain within 5' (1.5 m) of the heater.

In noncombustible walls only, vent terminal (P/N 02537801-1P) may be used.

For 4" (10 cm) vents in either combustible or noncombustible walls, use vent terminal (P/N 90502100) or equivalent insulated vent terminal. Follow the manufacturer's instructions for proper installation.

Instead of an insulated vent terminal, a listed thimble (with 2" air gap) may be used with a 4" vent cap (P/N 90502102).

### 6.5 Vertical Venting

Vertically vented heaters can be common vented (up to 4 heaters).

For vent lengths greater than 5' (1.5 m), condensation will form. Insulation is recommended and condensation drains may be desired. Vent from the rear of the heater cabinet then run the vent vertically and use a condensate drain at the bottom of the vertical vent.

Vent pipe must be sloped 1/4" (.6 cm) for every 1' (.3 m).

For 4" (10 cm), an approved vent cap (P/N 90502102) must be used.

For 6" (15 cm) common vent, an approved vent cap (P/N 90502103) must be used.

For common vertical venting of more than two heaters, See Page 10, Figure 5.

A vent shall not extend less than 2' (.6m) above the highest point where it passes through a flat roof of a building.

### 6.6 Length Requirements

If using vent lengths greater than 5' (1.5 m), condensation will form in the vent pipe. Insulation and additional sealing measures (high temperature silicone at all seams) are required.

The entire vent should be insulated with foil faced fiberglass insulation (1/2" thick, 1-1/2# density minimum).

**Maximum Vent Lengths Table**

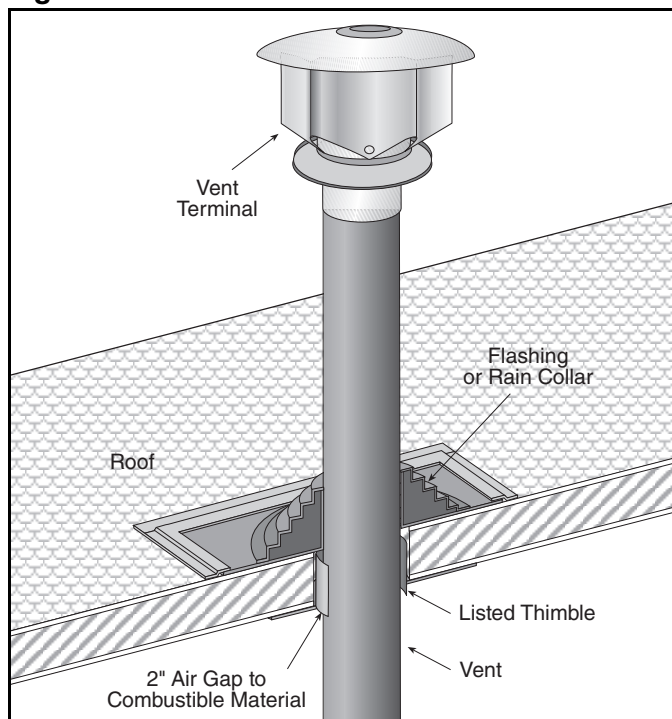
Model UHA[S] 150 - 400	# of Elbows
40 ft (12.2 m)	1
35 ft (10.7 m)	2
30 ft (9.1 m)	3
25 ft (7.6 m)	4
20 ft (6.1 m)	5

### 6.7 Vent Material

Vent material may be single wall 26 ga. (minimum) galvanized steel or equal thickness stainless steel. Completely seal all joints, refer to *Page 7, Section 6.2*.

If penetrating a combustible wall or roof, a listed thimble with 2" (5 cm) clearance must be used. Where local codes permit, a single section of type B-1 vent material may be used at the roof or wall penetration instead of a thimble. Ensure vent manufacturer's clearance from vent material is maintained. Seal annular space of the type B-1 vent as well as all joints in the remaining vent.

**Figure 3: Vent and Roof Detail**



**Figure 4: Standard Vented Heater - Vertical and Horizontal Vent Termination**

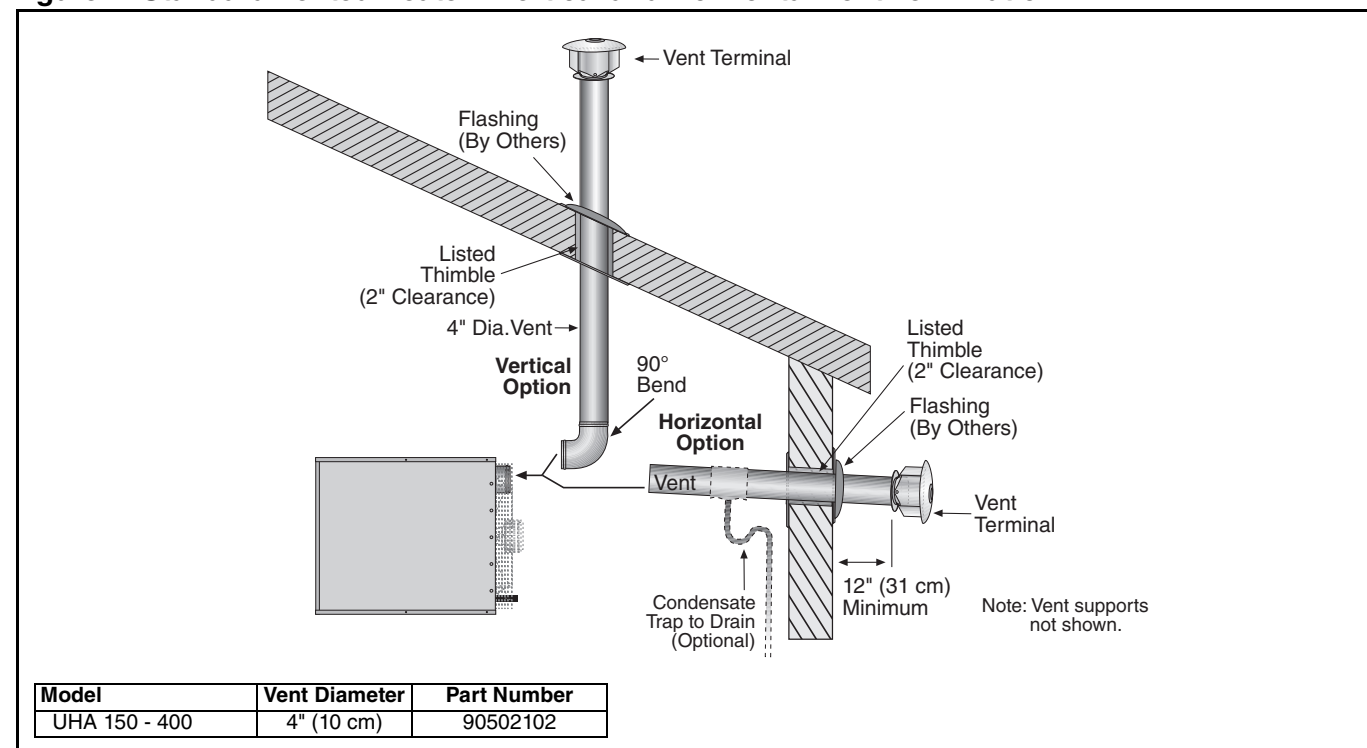
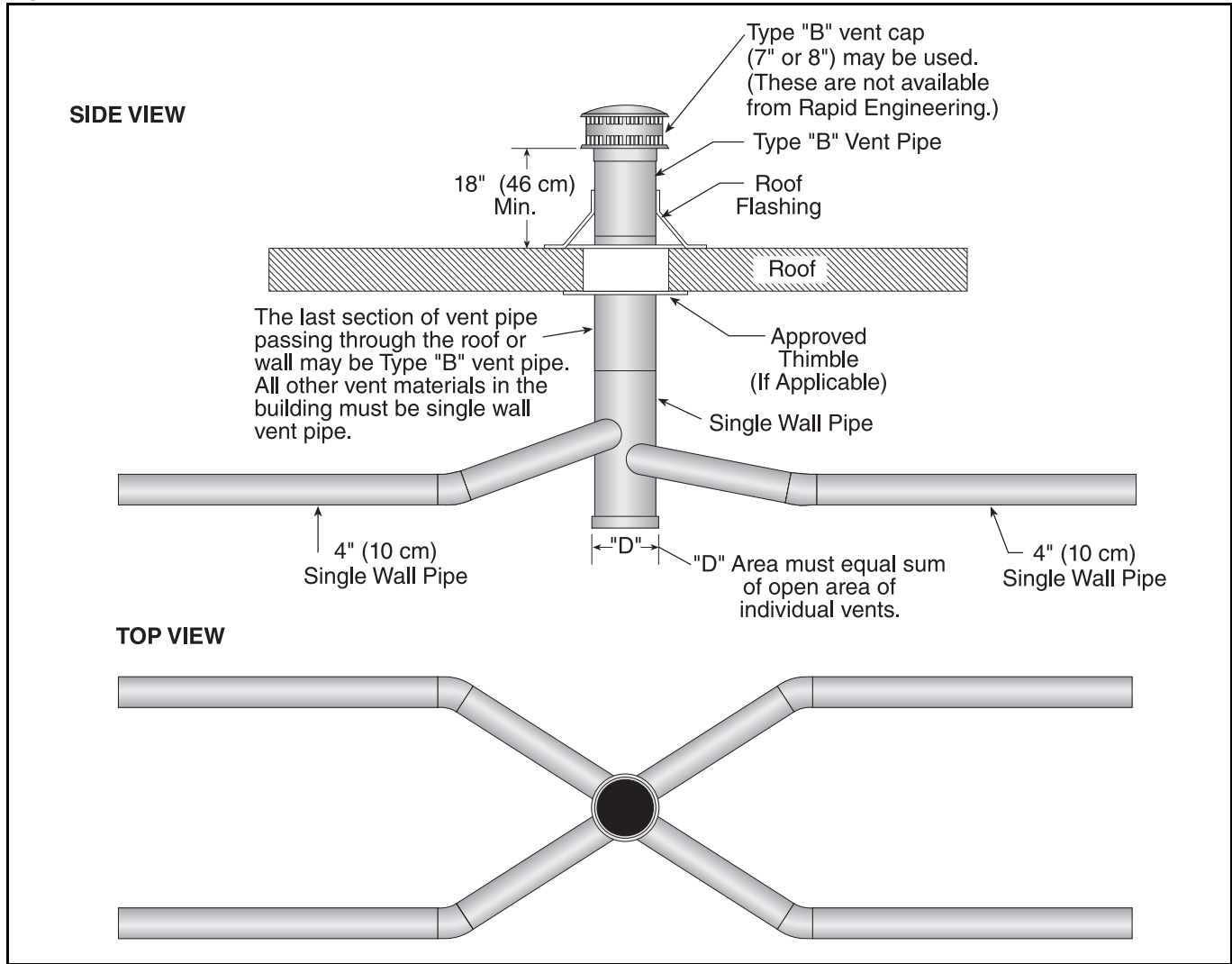
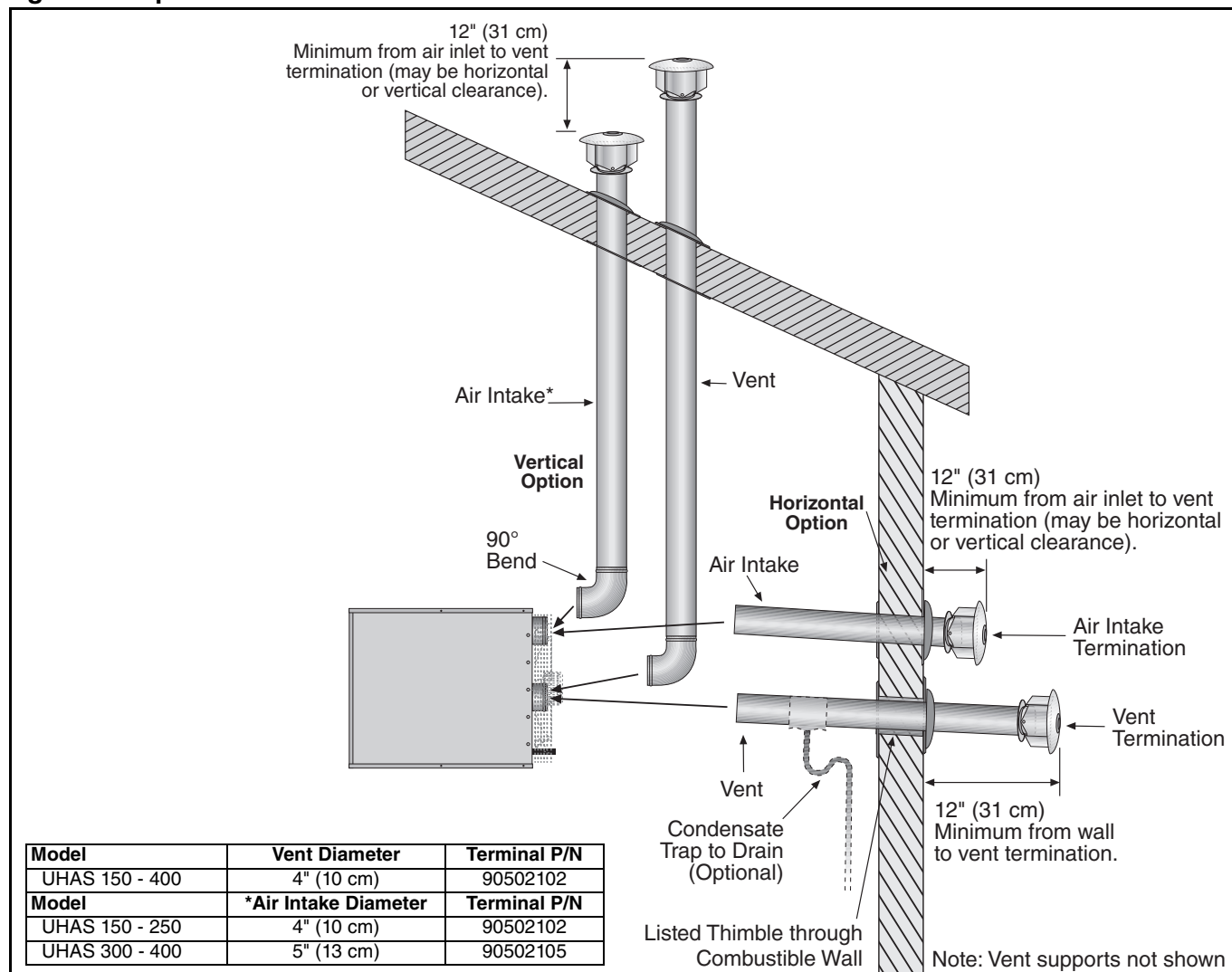
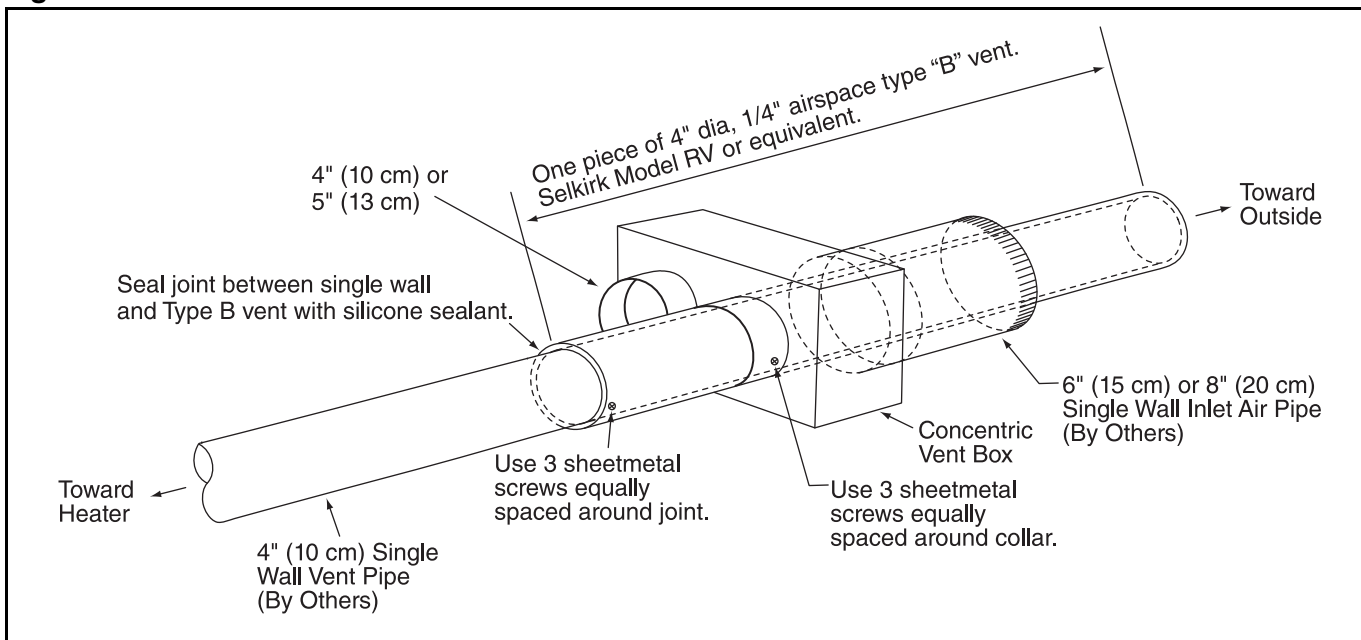


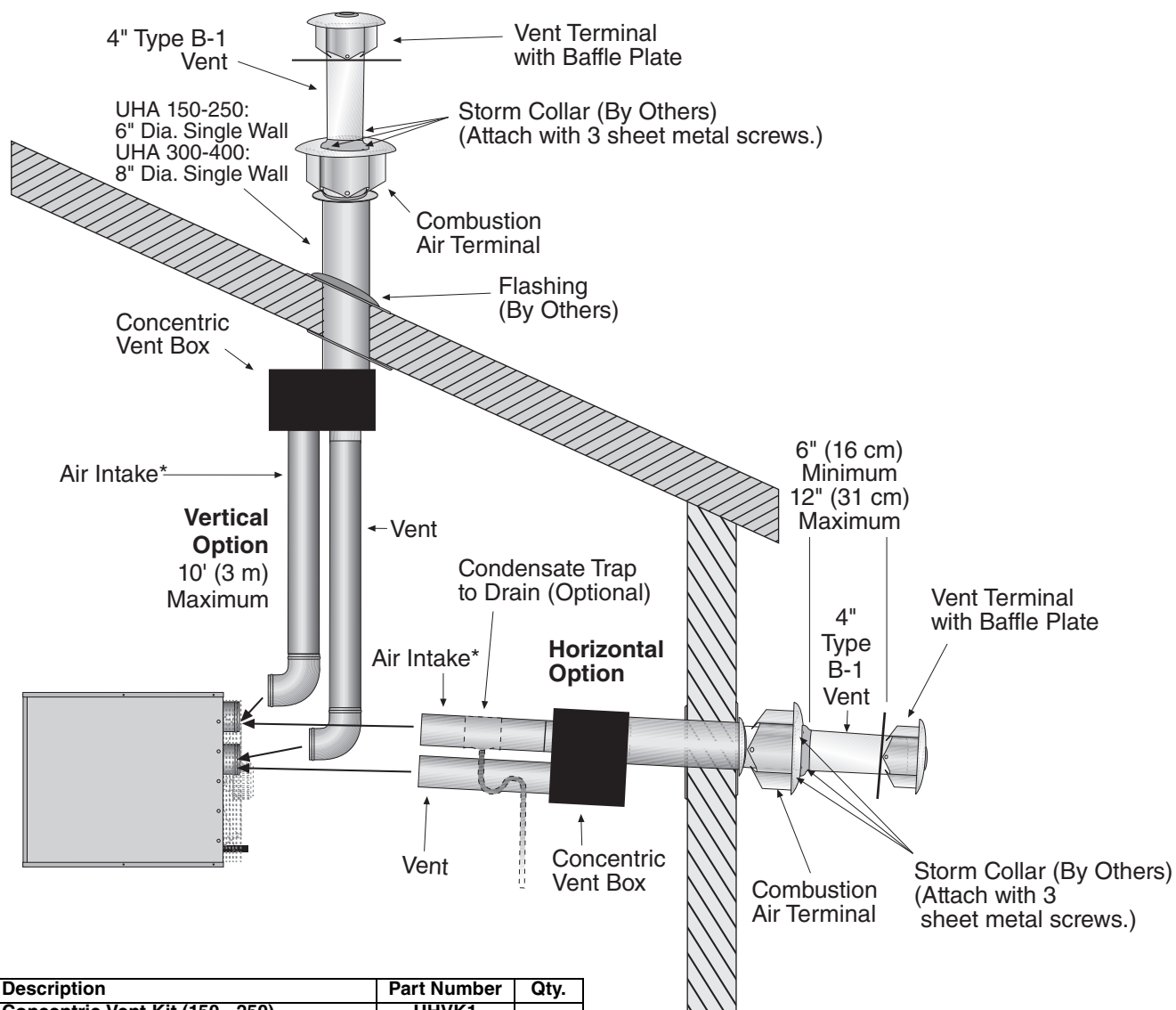
Figure 5: Standard Vented Heater - Common Vertical Vent Termination





**Figure 6: Separated Combustion Heater - Vertical and Horizontal Vent Termination****Figure 7: Concentric Vent Box**

**Figure 8: Concentric Vertical and Horizontal Vent Termination - Separated Combustion Heater**



Description	Part Number	Qty.
<b>Concentric Vent Kit (150 - 250)</b>	<b>UHVK1</b>	
Concentric Vent Box Top & Side Assembly	90504113	1
Concentric Vent Box Bottom Assembly	90504112	1
Screw #6 x 3/8 Self Drilling	91119100	14
4" Vent Terminal with Baffle Plate	90502102R	1
6" Combustion Air Terminal	90502103	1

Description	Part Number	Qty.
<b>Concentric Vent Kit (300 - 400)</b>	<b>UHVK2</b>	
Concentric Vent Box Top & Side Assembly	90504013	1
Concentric Vent Box Bottom Assembly	90504012	1
Screw #6 x 3/8 Self Drilling	91119100	14
4" Vent Terminal with Baffle Plate	90502102R	1
8" Combustion Air Terminal	90502104	1

Model	Vent Diameter
UHAS 150 - 400	4" (10 cm)
Model	*Air Intake Diameter
UHAS 150 - 250	4" (10 cm)
UHAS 300 - 400	5" (13 cm)

## SECTION 7: AIR SUPPLY

### 7.1 Separated Combustion Installation

When installed as a separated combustion heater (UHAS), the air for combustion is drawn in from outside the building. It is important to ensure that there is adequate space around heater to provide air for the axial air distribution fan.

### 7.2 Unvented Installation

It is important to ensure that there is adequate fresh air supply at all times for both combustion and heating requirements in accordance with local and national codes.

**WARNING:** *Combustion by-products contain a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.*

### 7.3 Building Ventilation

Where ventilation is required, air must be taken from an outside point where it is not likely to be contaminated or obstructed.

### 7.4 Outside Combustion Air Supply

If outside combustion air supply is required, separated combustion model (UHAS) heaters must be used.


**IMPORTANT:** If the building has a slight negative pressure or corrosive contaminants such as halogenated hydrocarbons are present in the air, an outside combustion air supply to the heater is required. Seal all combustion air pipe joints. The air supply duct may have to be insulated to prevent condensation on the outer surface. The outside air terminal must not be more than 1' (31 cm) above the vent terminal.

#### 7.4.1 Length Requirements

Follow the constraints listed on *Page 8, Section 6.6*.

## SECTION 8: GAS PIPING

**⚠ WARNING**



**Fire Hazard**

**Connect gas supply according to Figure 9.**

**Gas can leak if not installed properly.**

**Failure to follow these instructions can result in death, injury or property damage.**

It is important that the gas supply pipe and the electrical connections do not support any of the heater's weight.

A gas meter is connected to the service pipe by the gas supply company. An existing meter should be checked, preferably by the company, to ensure that the meter is adequate for the rate of gas supply required.

Installation pipes must be fitted in accordance with local and national codes. Pipes of smaller size than the heater inlet gas connection should not be used.

### 8.1 Connections

Connect the heater to the gas supply ensuring that the final connections are as follows:

- Gas supply pipe work is run in medium or heavy gauge tubing in compliance with local and national codes.

- Meter and service must be large enough to handle all the burners being installed plus any other connected load. The gas pipe which feeds the system must be large enough to supply the required gas with a maximum pressure drop of 1/2" w.c. When gas piping is not included in the layout drawing, contact the local gas supplier.
- An isolating valve and union connection should be used and fitted into the supply adjacent to the heater.
- A minimum 1/8" NPT plugged tapping accessible for test connection must be installed immediately upstream of the gas supply connection to the heater.
- For suspended heaters, an approved metal flexible connection between the isolating valve and the heater may be used. **To reduce pressure loss, use one pipe size larger than the heater gas connection.**

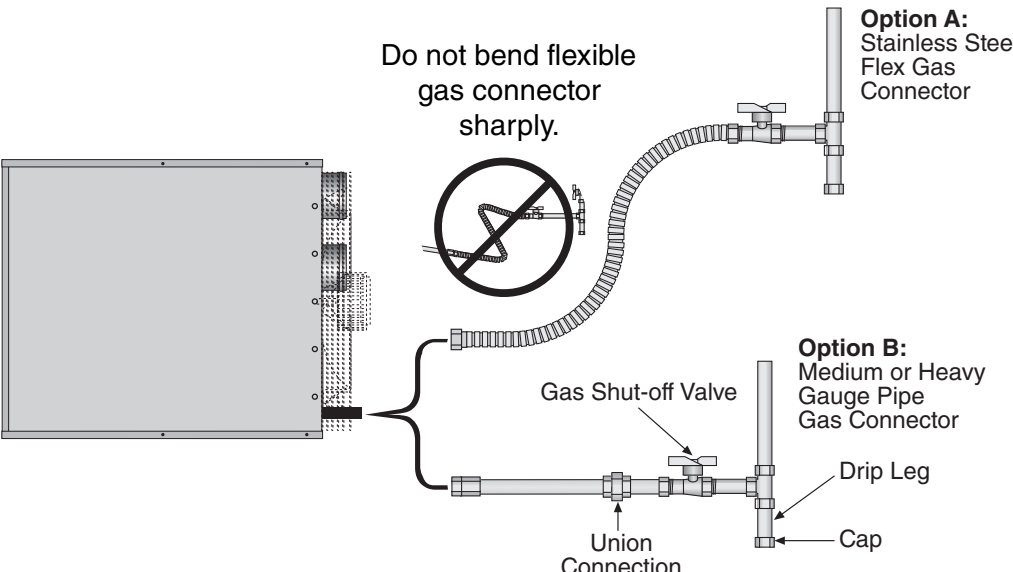
**IMPORTANT** - The complete installation must be purged and tested for gas soundness in accordance with local and national codes.

- **Do not high pressure (in excess of 1/2 psi [14" w.c.]) test the gas piping with the burner connected. Close manual shut-off valve during any pressure testing equal to or less than 1/2 psi (14" w.c.). Failure to follow these instructions can result in property damage.**

**Check the pipe and tubing ends for leaks before placing heating equipment into service. When checking for gas leaks, use a soap and water solution; never use an open flame.**

**Figure 9: Gas Connection**

- Hold gas nipple securely with pipe wrench when attaching the flex gas connector.
- Do not twist flexible gas connector.
- Ensure all joints are gas tight.



Do not bend flexible gas connector sharply.


**Option A:**  
Stainless Steel Flex Gas Connector

**Option B:**  
Medium or Heavy Gauge Pipe Gas Connector

Labels in Option B diagram: Gas Shut-off Valve, Union Connection, Drip Leg, Cap.

## SECTION 9: WIRING

**⚠ WARNING**



**Electrical Shock Hazard**

**Disconnect electrical power and gas supply before servicing.**

**This appliance must be connected to a properly grounded electrical source.**

**Failure to follow these instructions can result in death or electrical shock.**

All heater models require constant 120 V 60 Hz 1Ø power supply. Check heater(s) rating plate for electrical rating for proper circuit sizing. For servicing, a disconnect switch of proper electrical rating should be installed in the vicinity of the heater.

All heaters are equipped with thermostat connections suitable to power a 24 V thermostat.

Heater must be wired and electrically grounded in accordance with local codes. In the absence of local

codes in accordance with: United States: refer to National Electrical Code® NFPA 70 - latest revision  
Canada: refer to Canadian Electrical Code CSA C22.1 Part I - latest revision.

### 9.1 Positioning Thermostats

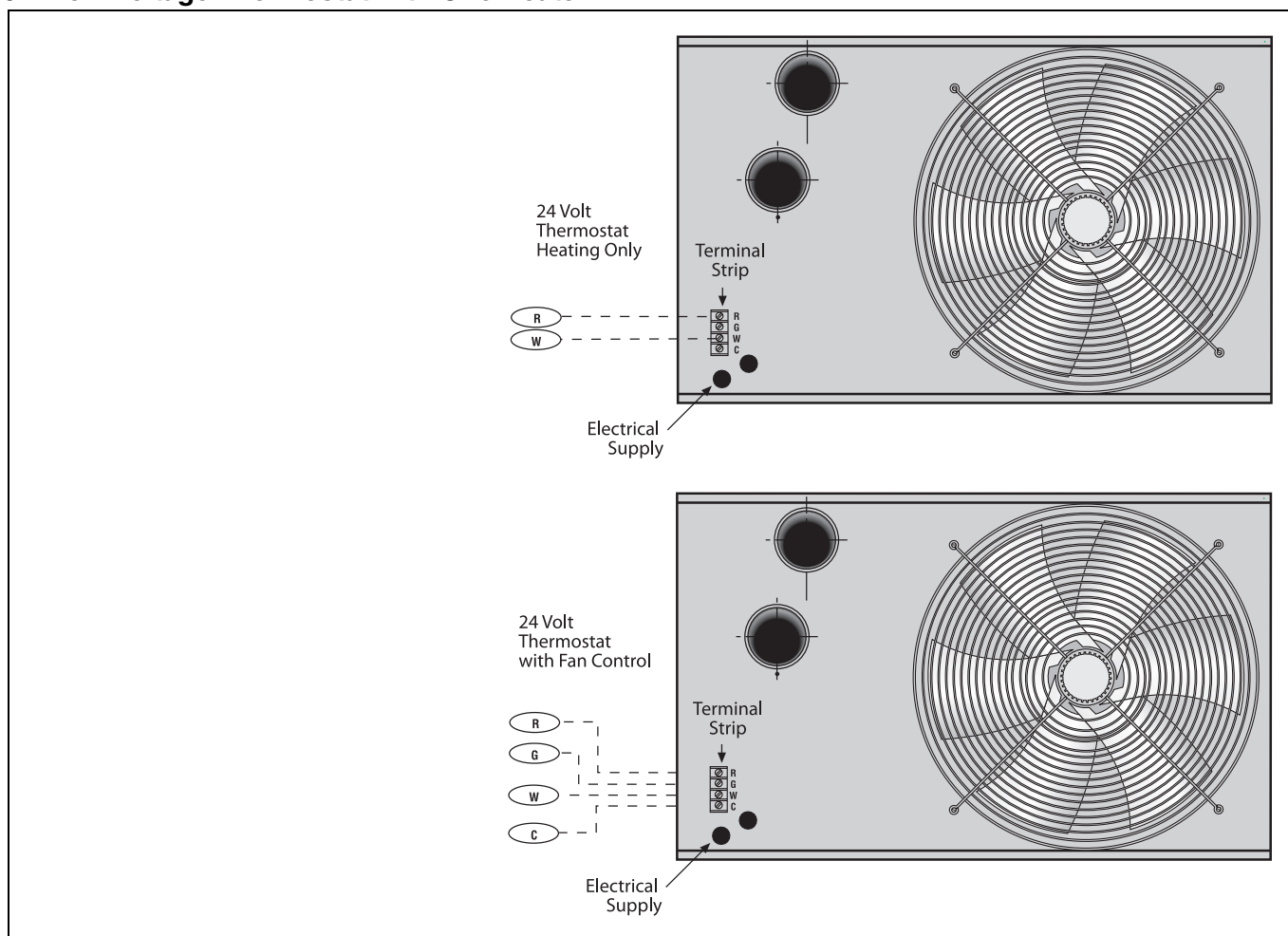
A room thermostat or RAPID™ control should be mounted on a vibration-free wall or column at a height of approximately 5' (1.5 m) from the floor to measure the ambient temperature. It should be clear of both cold drafts and the direct path of warm air from the heater.

Avoid mounting thermostat on outside walls or in areas directly exposed to radiant heat or sunlight. Install wall tag in a visible location near thermostat.

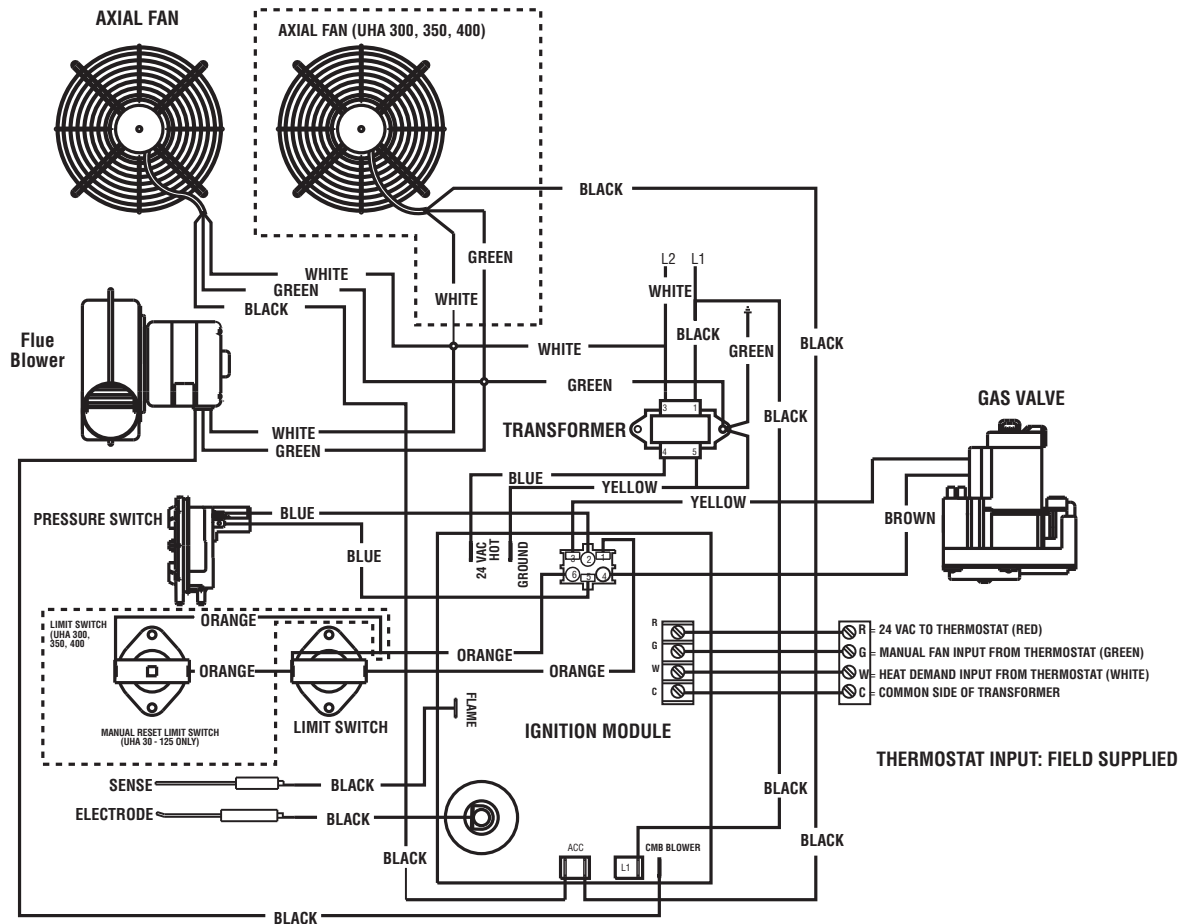
#### 9.1.1 Fan Control

The heater's axial fan can be used during the off-season for air circulation. A low voltage thermostat with fan control must be used. *See Page 15, Section 9.2* for thermostat connection details.

### 9.2 Low Voltage Thermostat with One Heater

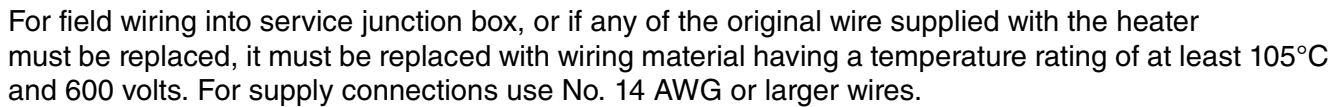


### 9.3 UHA[S] Series Internal Wiring Diagram

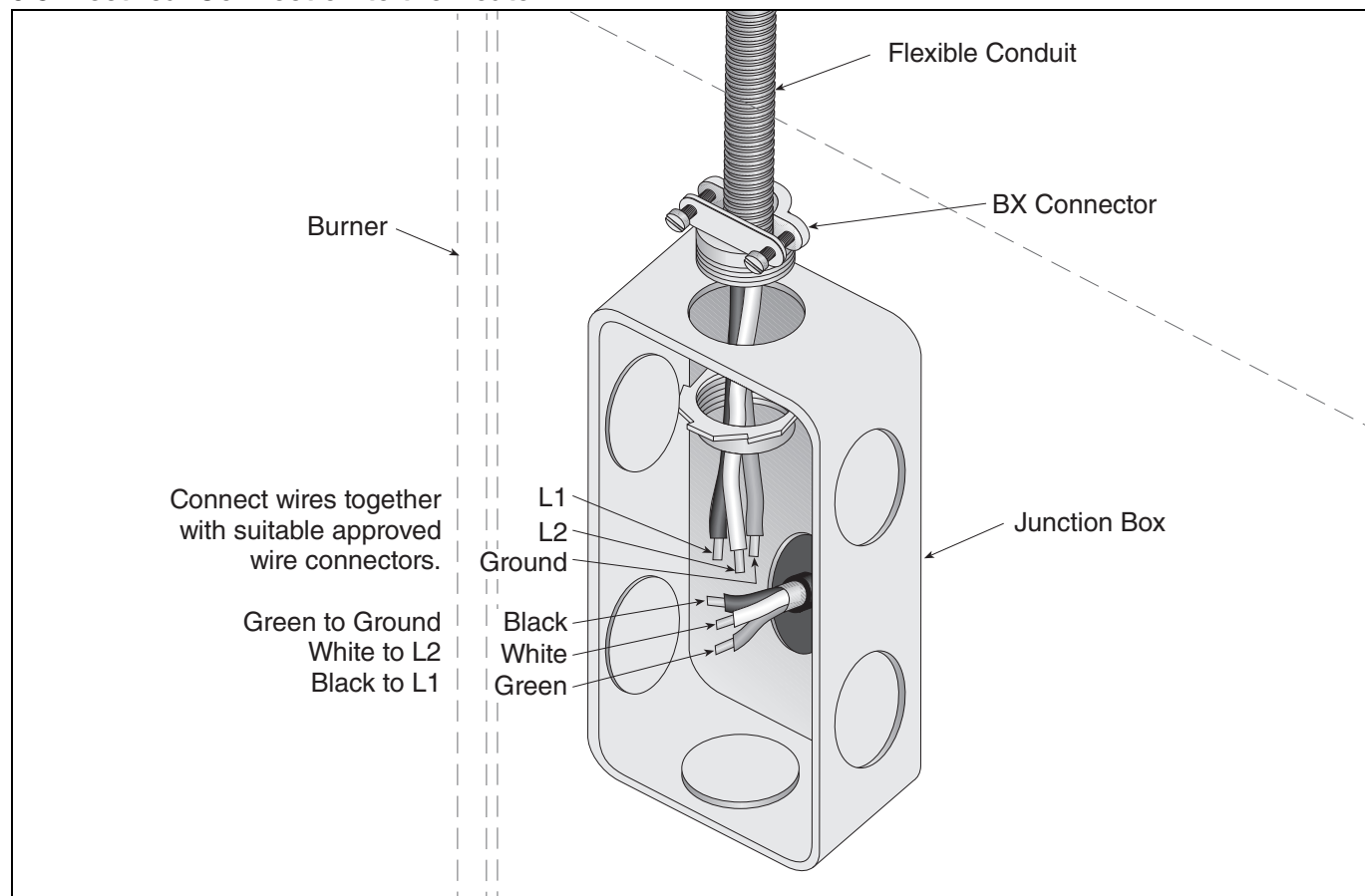


**NOTE:**

For field wiring into service junction box, or if any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C and 600 volts. For supply connections use No. 14 AWG or larger wires.



## 9.5 Electrical Connection to the Heater



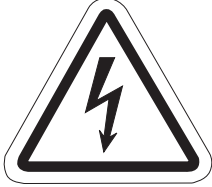
**Note:** Junction box is not provided with heater.

Conduit can also be attached directly to heater with wire junction made within the heater cabinet.



## SECTION 10: OPERATION AND MAINTENANCE

Installation, service, and annual inspection of the heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment. Read this manual carefully before installation, operation, or service of this equipment. All components are accessed via the door secured by 4 sheet metal screws. Opening the door exposes live electrical connections and hot components.

<b>⚠ WARNING</b>

<b>Electrical Shock Hazard</b>
<p><b>Use extreme caution during start-up.</b></p> <p><b>Controls compartment contains live electrical connections.</b></p> <p><b>Failure to follow these instructions can result in death or electrical shock.</b></p>


### 10.1 Pre-Start-Up Checks

**All pre-start-up checks must be carried out before lighting the heater.**

Ensure that the heater and all controls are suitable for the gas, pressure and electrical supply to which they are to be connected.

#### 10.1.1 Louvers

Where fitted, the air delivery louvers need to be set during start-up to give the required air distribution.

<b>⚠ WARNING</b>

<b>Cut Hazard</b>
<p><b>Turn off gas and electrical supply before maintenance.</b></p> <p><b>Fan can start automatically at any time.</b></p> <p><b>Failure to follow these instructions can result in severe injury or product damage.</b></p>

### 10.1.2 Electrical Checks

All pre-start-up checks must be carried out before start-up the heater.

1. Check that all site wiring is connected in accordance with the appropriate wiring diagram on *Page 16, Section 9.3.*

### 10.1.3 Gas Supply

All aspects of the gas installation including the gas meter must be inspected, tested for gas tightness and purged in accordance with local and national codes.

Ensure that the air is fully purged from the heater inlet pipe up to the main gas valve inlet test nipple.

### 10.1.4 Mechanical Checks

1. Check that the fan is free to run and delivery louvers are turned to give required air deflection.
2. Check that the flue (and air intake for separated combustion units) is installed in accordance with these instructions and local regulations.

## 10.2 Begin Start-Up

### 10.2.1 Before Operating the Heater

To ensure that all the controls are in safe working order, operate the heater for the first time with the isolating gas valve turned off and power supply turned on.

1. Turn off the isolating gas valve.
2. Turn up the thermostat above room temperature. The automatic ignition sequence will now begin as described on *Page 20, Figure 10.*

There will be no ignition of the burner and lockout will occur, which proves the controls are operating correctly.

Figure 10: Automatic Burner Control Sequence

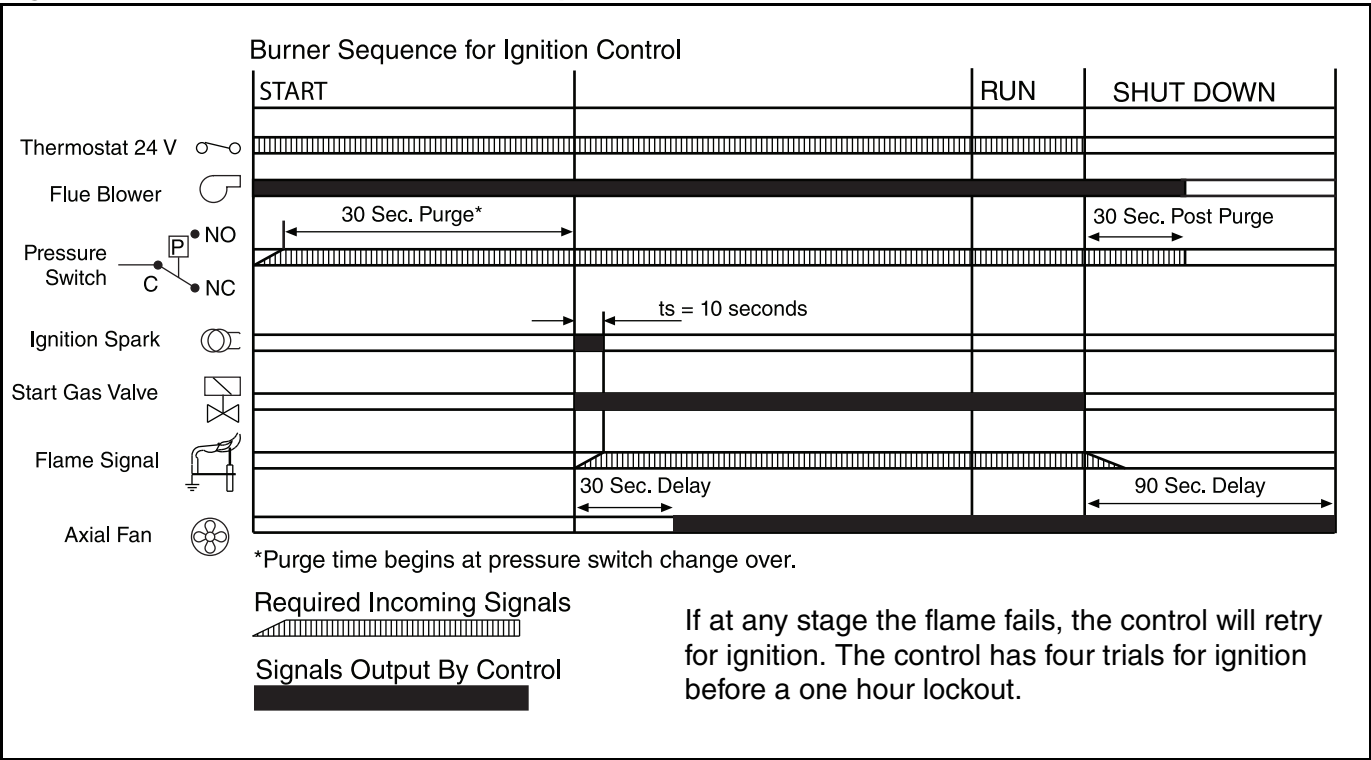
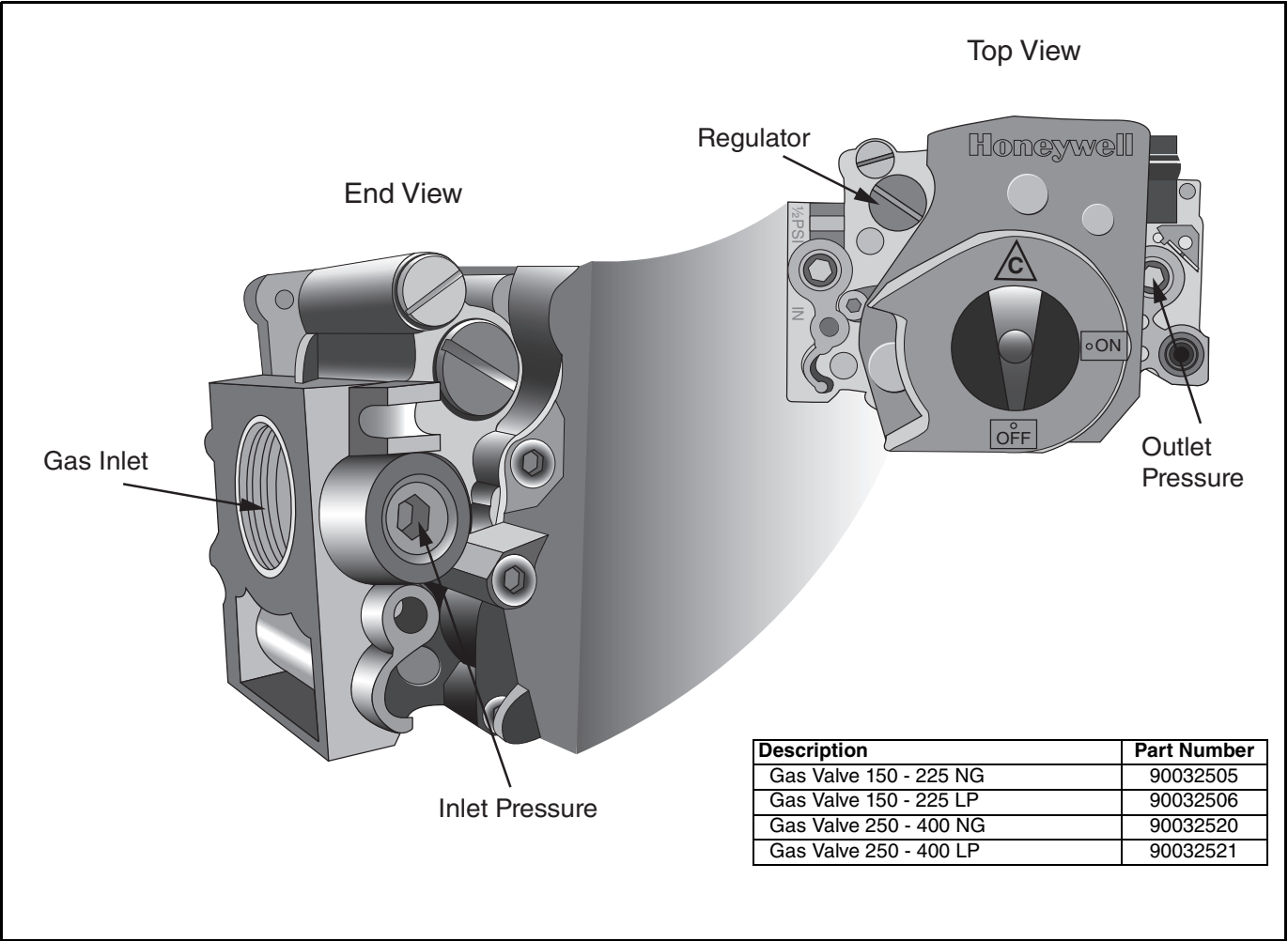


Figure 11: Gas Valve for Models UHA[S] 150 - 400



## 10.2.2 Start-Up the Gas Valve (All Gases)

### 10.2.2.1 Check Burner Gas Pressure

1. Remove the plug in the outlet (burner) pressure test point and connect a pressure tap and a manometer.
2. With the burner firing, measure the pressure on the manometer. To adjust the burner pressure, remove the regulator cover from the valve and turn the regulator adjustment screw to set the required burner pressure as stated in the Technical Data Tables for the correct gas and model on Page 39, Section 15.3.

**NOTE:** If the correct burner pressure cannot be reached, then check the inlet pressure to the valve with the burner firing. See Technical Data Tables on Page 39, Section 15.3 for inlet pressure requirement.

**Do not continue to adjust the regulator if the pressure is not changing.**

If the inlet pressure is too low to allow correct burner pressure setting, then the gas inlet pressure must be corrected before completing the commission.

### Check Gas Rate

1. After burner pressure adjustment, allow the heater to operate for at least 15 minutes and then re-check settings. Adjust pressure setting if necessary.
2. Check gas flow rate at gas meter.
3. Turn off heater and electrical supply.
4. Remove the manometer and refit all covers to the valve and tighten the screw of the outlet pressure tap.

### 10.2.3 Pressure Switch

The pressure switch is factory pre-set for each model and is not adjustable.

### 10.2.4 Turning Off the Heater

Set the thermostat to the "OFF" position or lowest setting and the main burner will stop.

The fan will run until it is stopped automatically by the fan thermostat.

**Do not use a disconnect switch for control of heater. Disconnect switch will turn off the fan. Heat exchanger could be damaged. Warranty will not cover damage to the heat exchanger if operated improperly. Only use the disconnect switch for turning off heater for service or during off-season.**

## 10.2.5 External Controls

External controls may include time switch, interlock switch, room thermostat and frost thermostat. Operate each control to ensure that they function correctly. Set the switches (if fitted) and thermostat(s) to the users' requirements.

## 10.3 Complete the Start-Up

Ensure that all covers are fitted correctly and all test points are properly sealed.

### 10.3.1 Instruction to the User

Explain the controls of the heater to the user including how to turn it on and off, using the controls fitted on site.

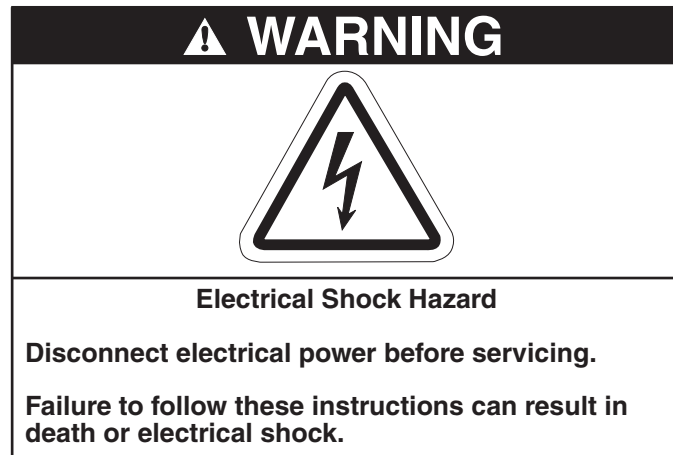
Give this manual to the user.

Ensure that the user is shown and understands the importance of maintaining clearances to combustibles on Page 4, Figure 1 and the user instructions on Page 22, Section 11 through Page 22, Section 11.4 and all warnings defined in this manual.

## SECTION 11: USER INSTRUCTIONS

### 11.1 User Instructions

The UHA[S] Series heaters are fully automatic and operate from the external controls fitted on site.



### 11.2 Heater Operation

When the heater has been switched on by the thermostat installed on site, the main burner will automatically turn on.

The burner control box will control the safe ignition of the flame.

All heaters require a constant gas and electricity supply which must not be interrupted during the normal operation of this heater.

### 11.3 Lighting Instructions

#### 11.3.1 To Turn On Heater

1. Ensure that the electrical and gas supplies to the heater are on. Check that the on site controls are "ON".

**NOTE:** The thermostat setting must be above the ambient temperature for the heater to operate.

2. The automatic firing sequence will begin as described on *Page 20, Figure 10*. The heater will now operate automatically under the control of the on site controls.

#### 11.3.2 To Turn the Heater Off

Set the thermostat to the "OFF" position.

The burner will turn off immediately.

The fan will continue to run for 90 seconds.

To restart, turn the thermostat above room temperature.

### 11.4 Simple Troubleshooting

Some possible reasons for the heater not operating are:

1. Gas supply not "ON".
2. Electricity supply not "ON".
3. The time and/or temperature controls are not "ON".
4. A limit switch may have operated. This may be caused by an interruption of the electrical supply, failure of the distribution fan or vent or heat exchanger blockage.

If a temperature limit switch persistently trips, there is a fault which must be investigated by a contractor qualified in the installation and service of gas-fired heating equipment.

#### 11.4.1 Simple Troubleshooting (Burner Fault)

If the burner fails to ignite for any reason, it will retry for ignition (4 trials total). After 4 unsuccessful ignition trials, the control will put the heater into lockout for 1 hour.

Lockout should not occur during normal operation of the heater and indicates there is a fault condition which must be corrected. There is an LED light on the ignition control that flashes codes to assist in fault correction. See *Figure 12* for LED indication codes.

**Figure 12: LED Diagnostic Codes**

LED INDICATION	FAULT MODE
Slow Flash	Normal Operation - No call for heat.
Fast Flash	Normal Operation - Call for heat.
2 Flashes	Ignition Lockout - No flame detected.
3 Flashes	Airflow Fault - Pressure switch open or closed.
4 Flashes	Temperature Limit or Manual Reset Limit Switch Open
5 Flashes	Flame Sense Error - Gas valve not energized.
Steady On	Internal Control Failure

**FOR YOUR SAFETY**

*If you smell gas:*

1. Open windows.
2. DO NOT try to light any appliance.
3. DO NOT use electrical switches.
4. DO NOT use any telephone in your building.
5. Leave the building.
6. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
7. If you cannot reach your gas supplier, call the Fire Department.

**⚠ WARNING****Fire Hazard**

Do not store or use petrol or other flammable vapours and liquids in the vicinity of this or any other appliance.


Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury or property damage.

## SECTION 12: SERVICING

### 12.1 Servicing Instructions

After start-up, the heater will require maintenance to be carried out annually. If the heater is used in a dirty or dusty area, more frequent maintenance may be necessary.


<b>WARNING</b>
<b>Cut Hazard</b>
<p>Turn off gas and electrical supply before maintenance.</p> <p>Fan can start automatically at any time.</p> <p>Failure to follow these instructions can result in severe injury or product damage.</p>

**NOTE 1:** After any maintenance or repair work, always test fire the heater in accordance with the start-up instructions on *Page 19, Section 10 through Page 21, Section 10.3.1* to ensure all safety systems are in working order before leaving the heater to operate. Minor faults may be traced by using the troubleshooting charts on *Page 27, Section 13 through Page 30, Section 13.5*.

**NOTE 2:** Check all gas pipes and pipe joints to ensure there are no cracks or gas leaks. Any cracks in the pipes or pipe joints must be repaired.

**NOTE 3:** Inspect all suspended components and hardware. Ensure that they are in good condition, properly tightened, and corrosion free.

### 12.2 Burner Maintenance

1. Open the door and remove the burner compartment cover. See *Page 32, Section 14.2*.
2. Clean any deposits from the main burner which may have formed in the injectors or venturi of the burner. See *Page 32, Section 14.2*.
3. Remove the ignition electrode and flame probe. Check condition of ignition electrode and flame probe. Clean off any deposits which may have been formed, check condition of ceramic insulators. Replace as necessary.

### 12.3 Fan/Motor Assembly Maintenance

The main fan bearings are permanently sealed and do not need lubrication. Before cleaning, turn off gas and electrical supply. Remove the fan and use a small brush or duster to clean the fan blades from each side. Replace fan when done.

### 12.4 Heat Exchanger Maintenance

The heat exchanger will remain clean unless a problem has developed with combustion. Inspect the heat exchanger. Look for signs of overheating at the front tubes which may indicate burner over firing or persistently low air flows.

### 12.5 Gas Valve Maintenance

No regular maintenance is required on this device. To change gas control valves, See *Page 31, Section 14.1*.

**Do not repair or disassemble gas valve.**

**Replace faulty gas valves with genuine replacement parts sold and supplied by Rapid Engineering.**



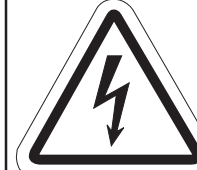
### 12.6 Flue Blower

The flue blower should not require maintenance. However, if the air pressure switch is causing burner lockout, then remove the flue blower from the vent box by unscrewing the three screws at the mounting plate. Remove the four screws attaching the mounting plate to the fan inlet (See *Page 35, Section 14.6*). Ensure that the fan is free to run and that the fan wheel is clean.

### 12.7 Venting and Air Intake Pipe

Inspect all venting and air intake pipe. Ensure that all seams are sealed and suspension points secure. Repair suspension points if any part of the venting or combustion air pipe is sagging. Check to make sure any insulation is not missing or in poor condition. Replace as necessary. Check all venting and air intake components to ensure they are in good condition, gas tight and corrosion-free.

## 12.8 Maintenance Checklist

 <b>WARNING</b>		
		
<b>Explosion Hazard</b>		
<p>Service and annual inspection must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.</p> <p>Turn off gas and electrical supplies before performing service or maintenance.</p> <p>Failure to follow these instructions can result in death, injury or property damage.</p>		

**Installation Code and Annual Inspections:** All installations and service of RAPID™ equipment must be performed by a contractor qualified in the installation and service equipment sold and supplied by Rapid Engineering and conform to all requirements set forth in the RAPID™ manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment.

To help facilitate optimum performance and safety, Rapid Engineering recommends that a qualified contractor annually inspect your RAPID™ equipment and perform service where necessary, using only replacement parts sold and supplied by Rapid Engineering.

<b>The Vicinity of the Heater</b>	<p>Do not store or use flammable objects, liquids or vapors near the heater. Immediately remove these items if they are present.</p> <p><i>See Page 3, Section 3.</i></p>
<b>Vehicles and Other Objects</b>	<p>Maintain the clearances to combustibles.</p> <p>Do not hang anything from, or place anything on, the heater.</p> <p>Make sure nothing is lodged in between the heat exchanger or in the louvers.</p> <p>Immediately remove objects in violation of the clearances to combustibles.</p> <p><i>See Page 3, Section 3.</i></p>
<b>Vent Pipe/Terminals</b>	<p>Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust.</p> <p>Remove any carbon deposits or scale using a wire brush.</p> <p>If the vent terminal has a screen built in, remove any dirt, dust or deposits from the screen.</p> <p><i>See Page 13, Section 7.</i></p>
<b>Combustion Air Intake Pipe</b>	<p>Intake pipe and inlet must be intact. Look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust. Clean and reinstall as required.</p>
<b>Heat Exchanger</b>	<p>Make sure there are no cracks.</p> <p><i>See Page 14, Section 8.</i></p> <p>Make sure there is no sagging, bending or distortion.</p> <p>Clean or replace as required.</p>
<b>Gas Line and Shut-off Valves</b>	<p>Check for gas leaks. <i>See Page 14, Section 8.</i></p>

<b>Burner Observation Window</b>	Make sure it is clean and free of cracks or holes. Clean and replace as required.
<b>Flue Blower Scroll, Wheel and Motor</b>	Compressed air or a vacuum cleaner may be used to clean dust and dirt.
<b>Inshot Burners and Orifices</b>	Clear of obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.
<b>Direct-Spark Igniter</b>	Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode. The electrode gap should be 1/8" (3.2 mm).
<b>Thermostat</b>	There should be no exposed wire or damage to the device or wiring. <i>See Page 19, Section 10.</i>
<b>Suspension Points</b>	Make sure the heater is hanging securely. Look for signs of wear on the suspension materials or ceiling. <i>See Page 6, Figure 2.</i>
<b>Silicone Tubing</b>	Ensure tight, secure fit on all pressure fittings at pressure switch, burner partition, and blower outlet.
<b>Gas Valve</b>	Verify that cap covering pressure regulator adjustment screw is secure and has not been tampered with. Verify all wiring connections.
<b>Condensate Drain (when installed)</b>	Flush drain and clear any obstructions.



## SECTION 13: TROUBLESHOOTING

## 13.1 General

**⚠ WARNING**

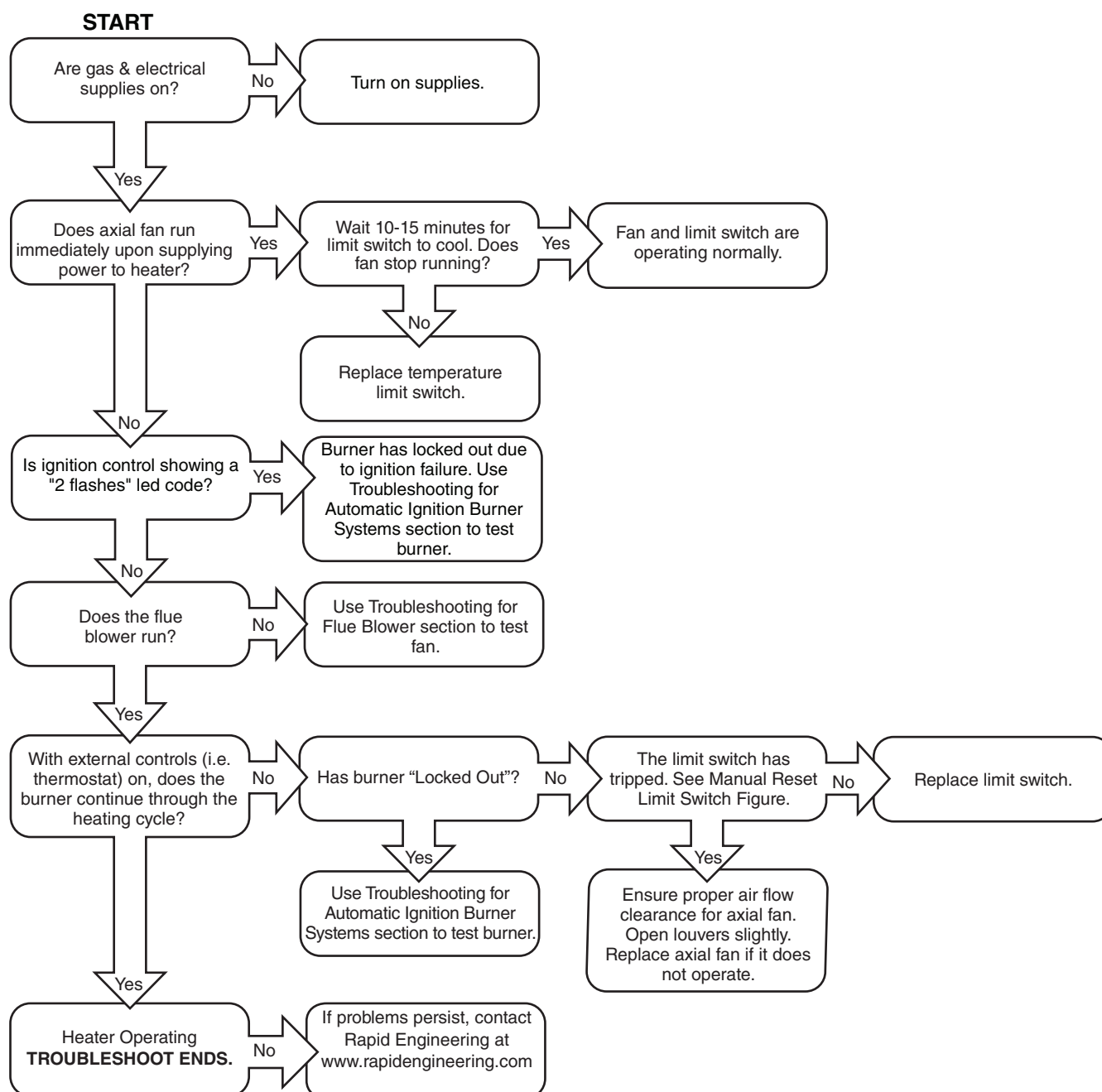




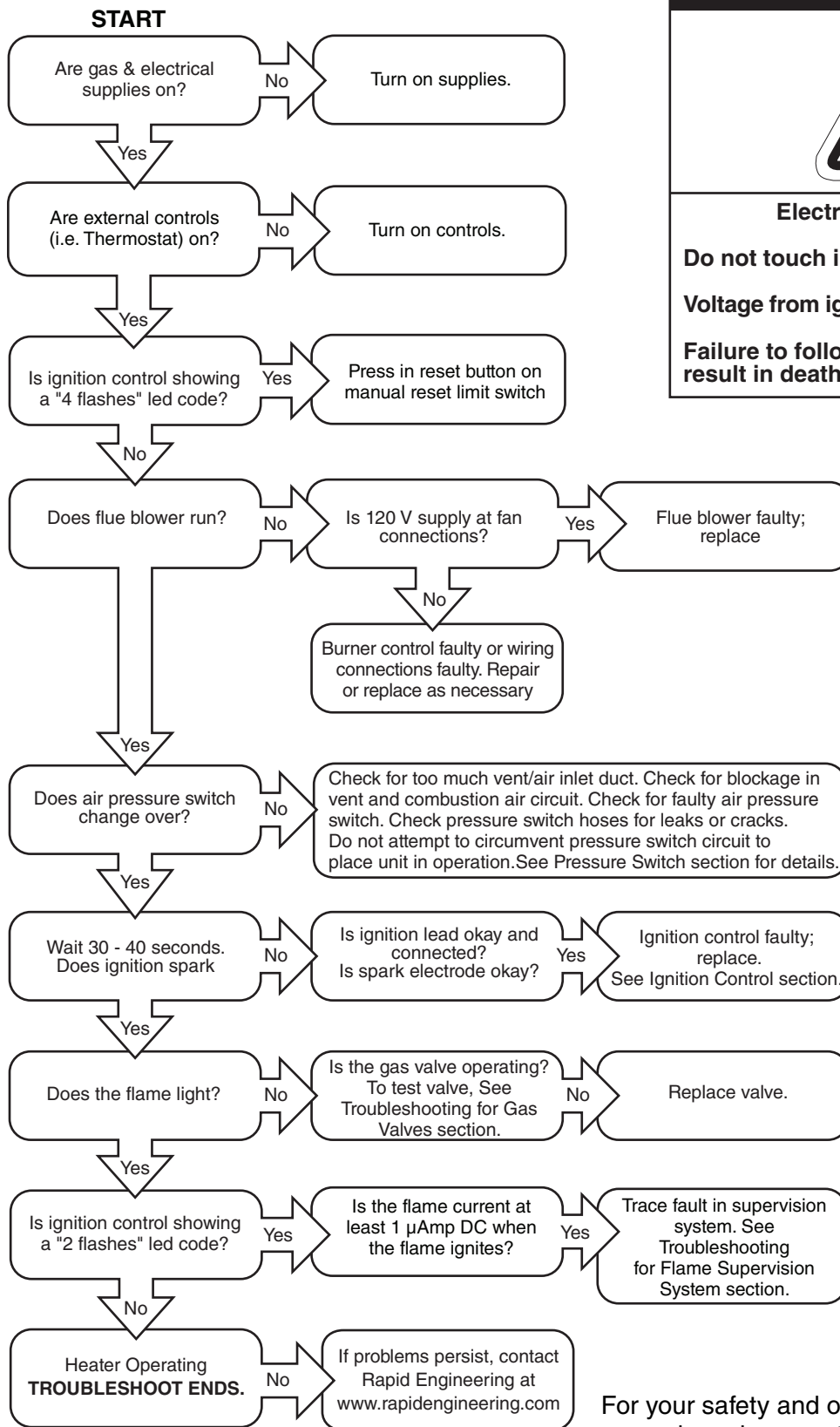
**Explosion Hazard**

**Installation must be done by a registered installer/contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.**

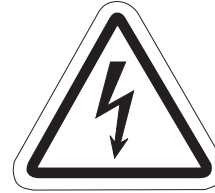
**Failure to follow these instructions can result in death, injury or property damage.**



## 13.2 Troubleshooting For Automatic Ignition Burner Systems



### ⚠ WARNING



#### Electrical Shock Hazard

**Do not touch ignition components.**

**Voltage from ignition components is high.**

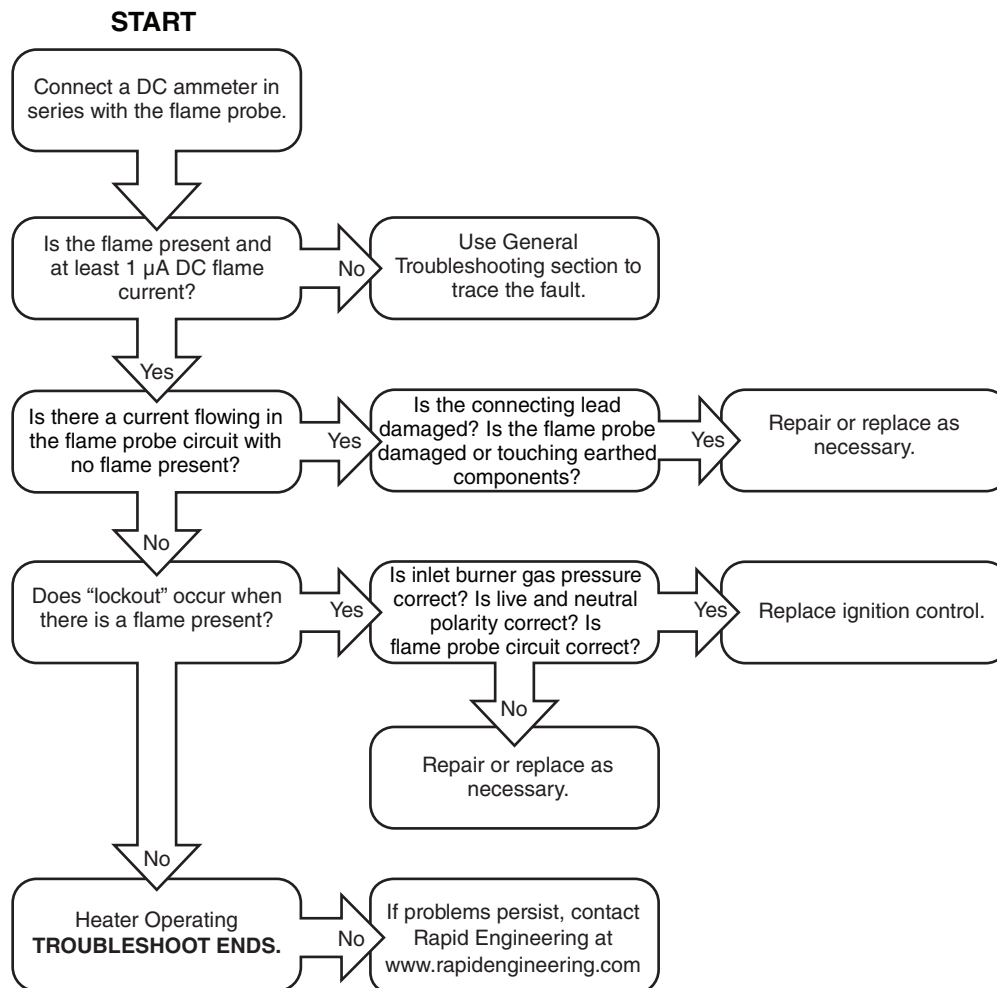
**Failure to follow these instructions can result in death or electrical shock.**

For your safety and optimum heater performance, use only replacement parts sold and supplied by Rapid Engineering.

**Conduct start-up procedure as shown on Page 19, Section 10.**

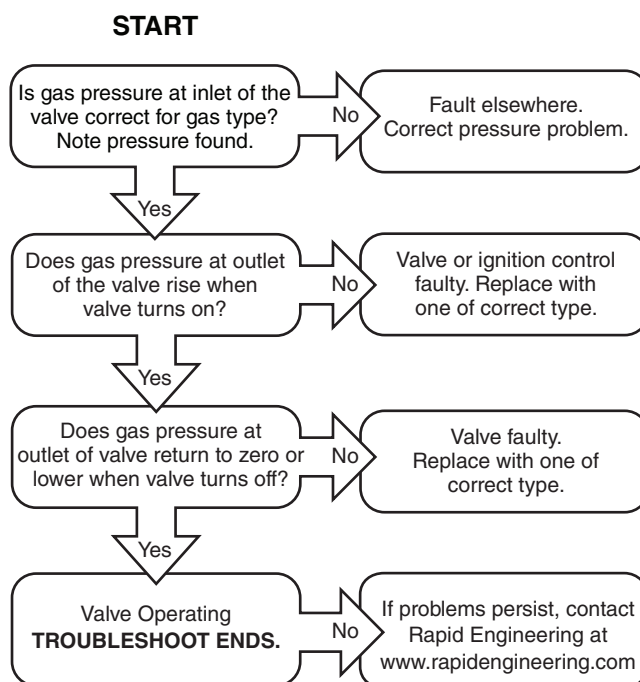
### 13.3 Troubleshooting for Flame Supervision System

To measure flame current, connect a 0 - 50  $\mu\text{A}$  DC meter in series with the flame probe. If the meter reads negative values, then reverse the test leads.

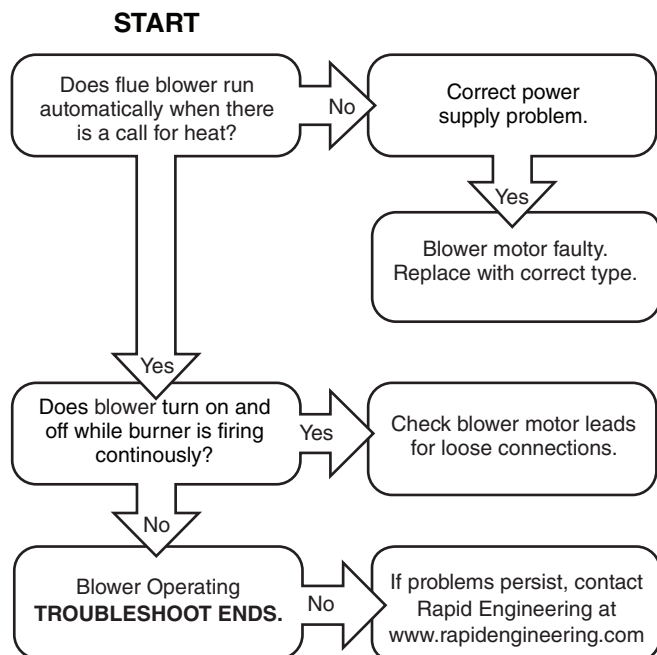


**NOTE:** Minimum flame probe current 1  $\mu\text{A}$  DC. Typical flame probe current 3-5  $\mu\text{A}$  DC.

## 13.4 Troubleshooting for Gas Valves



## 13.5 Troubleshooting for Flue Blower



For your safety and optimum heater performance, use only genuine replacement parts sold and supplied by Rapid Engineering.  
**Conduct start-up procedure as shown on Page 19, Section 10.**

## SECTION 14: REPLACEMENT PARTS

See warnings and notes on *Page 24, Section 12* before removing or replacing parts.

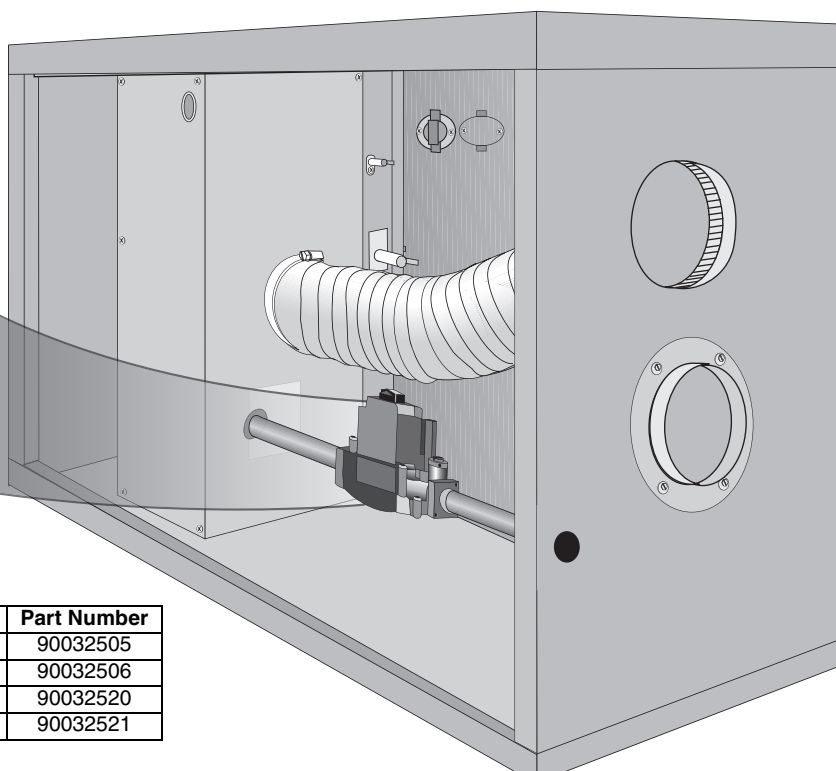
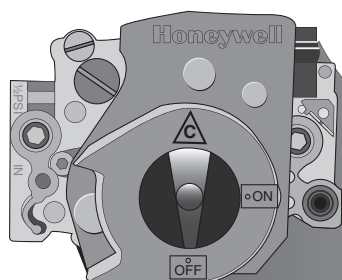
### Burner Components

All serviceable burner parts are accessed by the door on the side of the heater. Remove the sheetmetal screws.

#### 14.1 Gas Valve

Remove the gas supply pipe at the heater inlet.

**NOTE:** Flexible duct only applies for models UHAS.



Description	Part Number
Gas Valve, NG (Models UHA[S] 150 - 225)	90032505
Gas Valve, LP (Models UHA[S] 150 - 225)	90032506
Gas Valve, NG (Models UHA[S] 250 - 400)	90032520
Gas Valve, LP (Models UHA[S] 250 - 400)	90032521

Follow steps in *Section 14.2* and *See Page 32, Section 14.2.1* to remove gas valve/manifold.

Replace in reverse order. Verify that the gas flow direction of the valve is correct. Use a minimum amount of gas seal on the thread joint. Check that all the joints are leak free. Reset gas valve. See *Page 21, Section 10.2.2*.

**IT IS IMPORTANT THAT ONLY THE CORRECT GAS VALVE IS USED WHEN REPLACING THESE CONTROLS.**

14.2 Burner Compartment

The burner compartment is a sealed compartment. Following any work, re-seal the compartment with the gas pipe rubber seal fully in place and all screws fitted and tight.

**NOTE:** Flexible duct only applies for models UHAS.

Diagram showing the burner compartment with labels: Burner compartment cover, Flame probe, Viewing port for flame probe, Remove flexible air duct from spigot, Ignition electrode, Viewing port for ignition electrode, Remove access plate, Rubber Seal, and Remove screws and pull off burner cover.

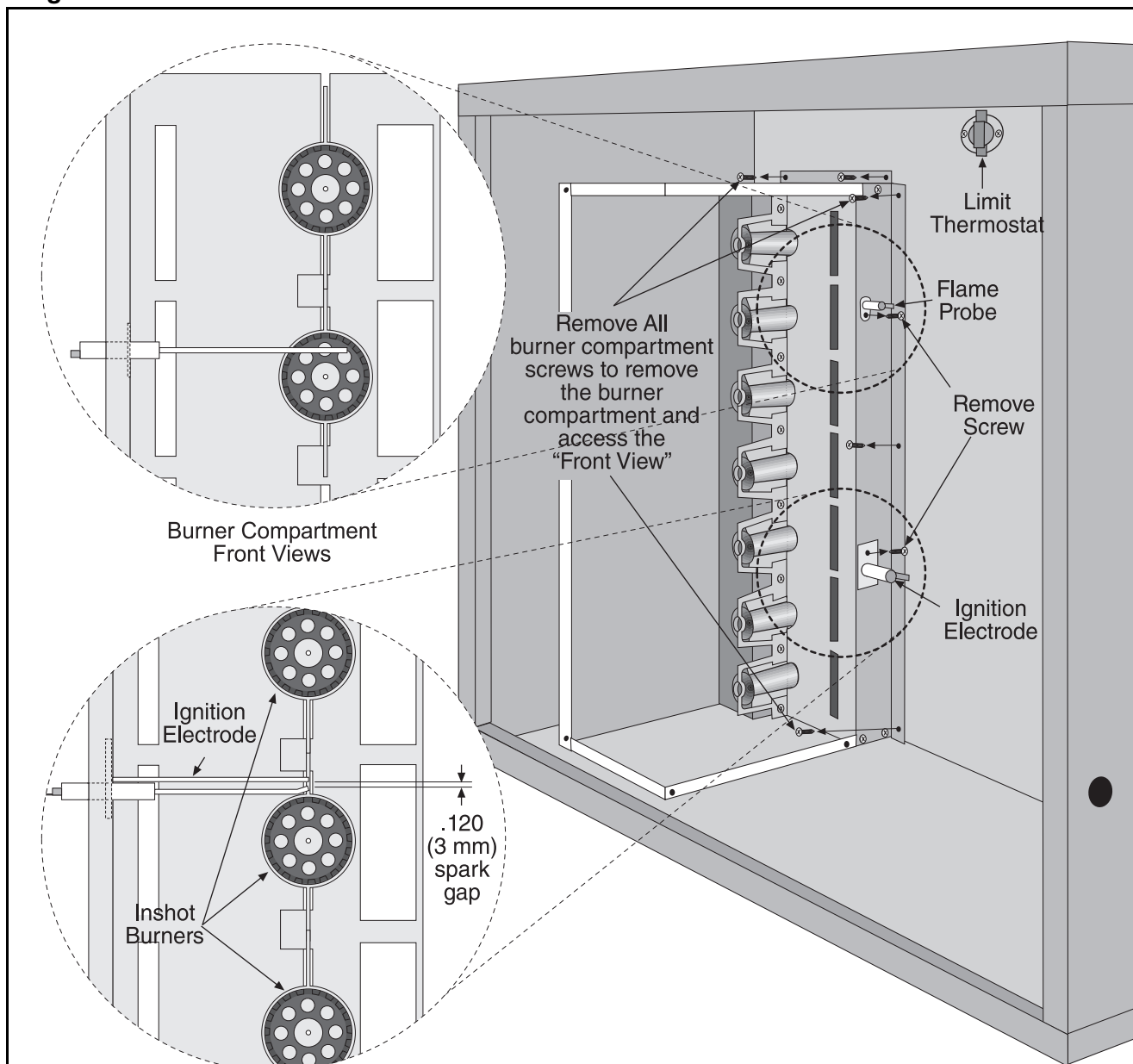
14.2.1 Burner Injectors

Ensure gas tight fitting of injectors.  
Ensure correct alignment with burners.  
Ensure all pipe joints are gas tight.

Diagram showing the burner injectors with labels: Manifold, Remove manifold screws and pull out manifold, Inshot Burners, Injectors, Burner Screws, and a circular inset showing Manifold, Unscrew Orifices, and Marking.

MODEL	UHA[S] 150	UHA[S] 175	UHA[S] 200	UHA[S] 225	UHA[S] 250	UHA[S] 300	UHA[S] 350	UHA[S] 400
Orifice Quantity	7	8	9	10	11	12	14	14
Natural Gas (G20)								
Orifice Marking	43	43	2.25 mm	2.25 mm	2.25 mm	40	40	40
P/N	91930043	91930043	91930225	91930225	91930225	91930040	91930040	91930040
Propane (G31)								
Orifice Marking	1.35 mm	1.35 mm	54	54	54	1.45 mm	53	53
P/N	91930135	91930135	91930054	91930054	91930054	91930145	91930053	91930053

## 14.3 Ignition Electrode and Flame Probe



To replace the electrode or flame probe, remove the electrical lead and screw. Pull out from mounting. Refit in reverse ensuring that the gap to burner is as shown in the front view of the burner compartment.

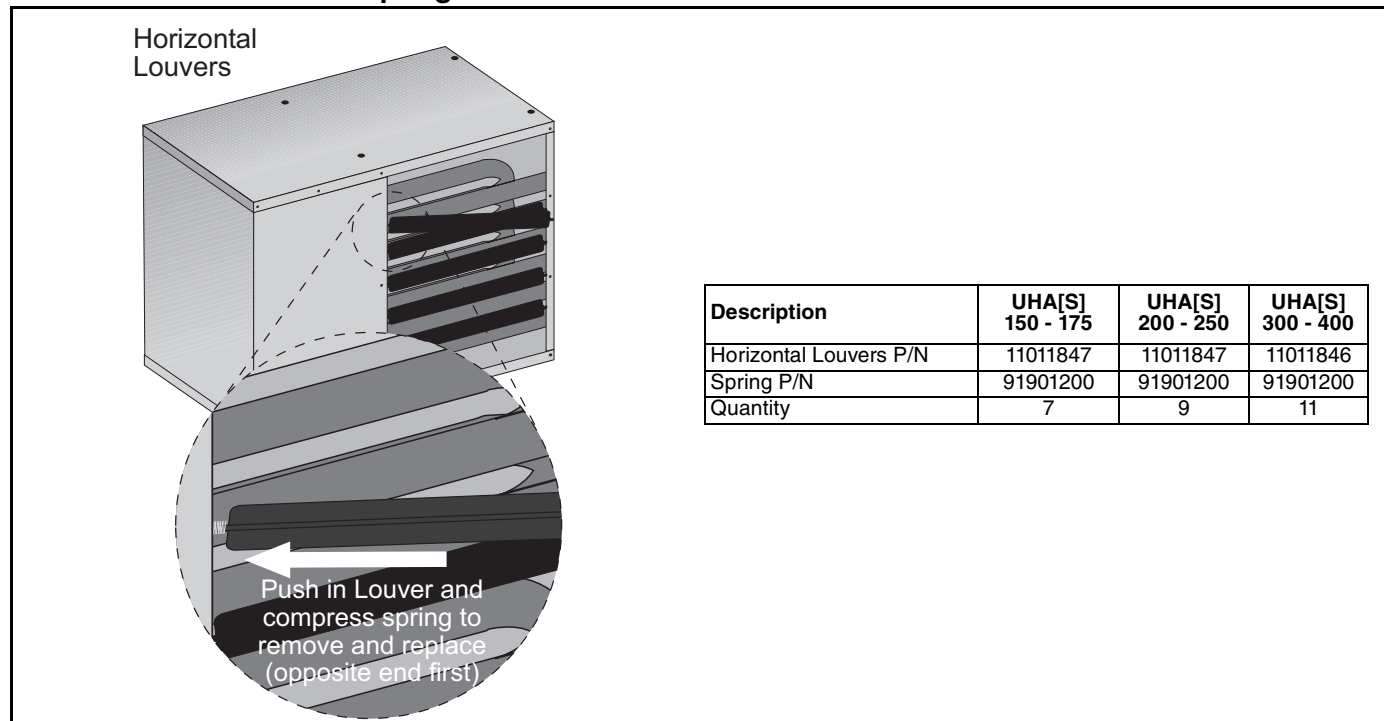
Description	Part Number	Qty.
Spark Electrode	90427411	1
Automatic Ignition Flame Probe	90439300	1
Transformer	90436900K	1
Ignition Module	90434008	1
Inshot Burners UHA[S] 150	92000001	7
Inshot Burners UHA[S] 175	92000001	8
Inshot Burners UHA[S] 200	92000000	9
Inshot Burners UHA[S] 225	92000000	10
Inshot Burners UHA[S] 250	92000000	11
Inshot Burners UHA[S] 300	92000000	12
Inshot Burners UHA[S] 350	92000000	14
Inshot Burners UHA[S] 400	92000002	14
Limit Switch (150 - 400)	90412103	1
Limit Switch (300 - 400)	90412105	2

## 14.4 Heat Exchanger

The standard heat exchanger assembly is composed of multiple tubular heat exchangers in models UHA[S]150 - UHA[S]400, there is a four pass exchange.

MODEL		UHA[S] 150	UHA[S] 175	UHA[S] 200	UHA[S] 225	UHA[S] 250	UHA[S] 300	UHA[S] 350	UHA[S] 400
<b>Aluminized Heat Exchanger Assembly</b>	P/N	12117100	12116100	12115100	12114100	12113100	12112100	12111100	12111100
<b>Stainless Heat Exchanger Assembly</b>	P/N	12117100SS	12116100SS	12115100SS	12114100SS	12113100SS	12112100SS	12111100SS	12111100SS
Tube Heat Exchanger	Qty	7	8	9	10	11	12	14	14
Tube Plate		1	1	1	1	1	1	1	1
Tube Support		2	2	2	2	2	2	2	2
Tube Support Strap		N/A	N/A	1	1	1	1	1	1
Base Panel		1	1	1	1	1	1	1	1
End Panel Insulated		1	1	1	1	1	1	1	1
Top Panel Insulated		1	1	1	1	1	1	1	1
Rear Panel		1	1	1	1	1	1	1	1
Front Panel		1	1	1	1	1	1	1	1
Rear Fan Panel		1	1	1	1	1	1	1	1
Screws Type A/B		42	45	45	50	50	50	50	50

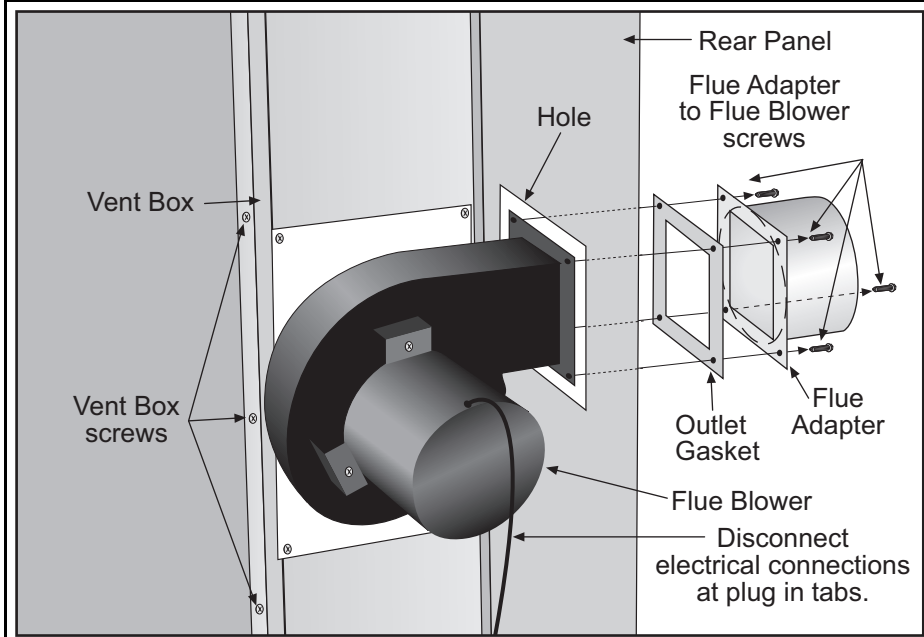
## 14.5 Louvers and Louver Spring



The louvers for standard range models UHA[S]150 - UHA[S]400 are only available in horizontal configurations.

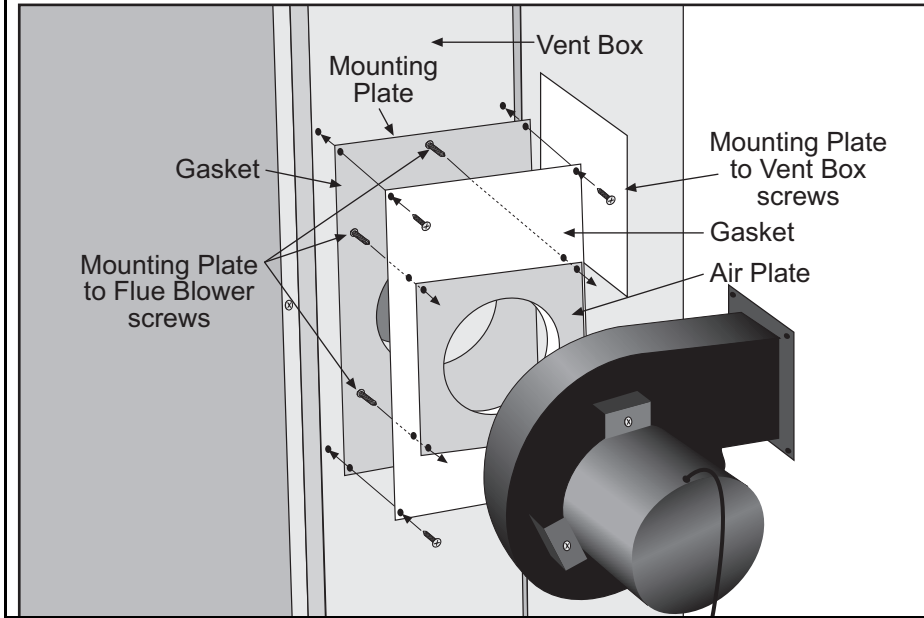


14.6 Flue Blower



Remove screws securing outlet flange to the flue adapter.

Refit in reverse order.



Remove screws securing flue blower mounting plate to vent box.

Remove screws securing mounting plate to blower.

Refit in reverse.

Use new gaskets.

Ensure sealed joints.

Ensure mounting plate orifice is clear and not obstructed.

MODEL	UHA[S] 150 - 175	UHA[S] 200 - 300	UHA[S] 350 - 400
Flue Blower P/N	90710405	90710403	90710402


**IT IS IMPORTANT THAT ONLY THE CORRECT FLUE BLOWER SPECIFIED FOR EACH MODEL TYPE IS USED WHEN REPLACING THESE ITEMS.**

Carry out a start-up after working on or changing a flue blower. See Page 22, Section 11.

### 14.7 Pressure Switch

Pull off 3 way connector. Spring open plastic clips of mounting cradle. Replace with correct type of pressure switch for model. The pressure switches are color coded for each pressure setting.

**⚠ WARNING**



**Carbon Monoxide Hazard**

**Use correct pressure switch specified for each model.**

**Use of incorrect pressure switch or disabling pressure switch circuit could cause unsafe condition.**

**Failure to follow these instructions can result in death or serious injury.**

Carry out a commission after working on or changing a pressure switch. *See Page 19, Section 10.*

MODEL	UHA[S] 150 - 175	UHA[S] 200 - 225	UHA[S] 250	UHA[S] 300 - 350	UHA[S] 400
Pressure Switch Kit P/N	90439802	90439808	90439803	90439807	90439808
Color Code	yellow	orange	gray	brown	orange
Set Point in. w.c.	.32	.79	.41	.68	.79
Pressure Switch Snap Ring P/N	90439850	90439850	90439850	90439850	90439850

### 14.8 Ignition Control

The control mounts to the electrical plate. Pull out ignition cable and wiring from board, noting their positions.

Release the four mounting standoffs.

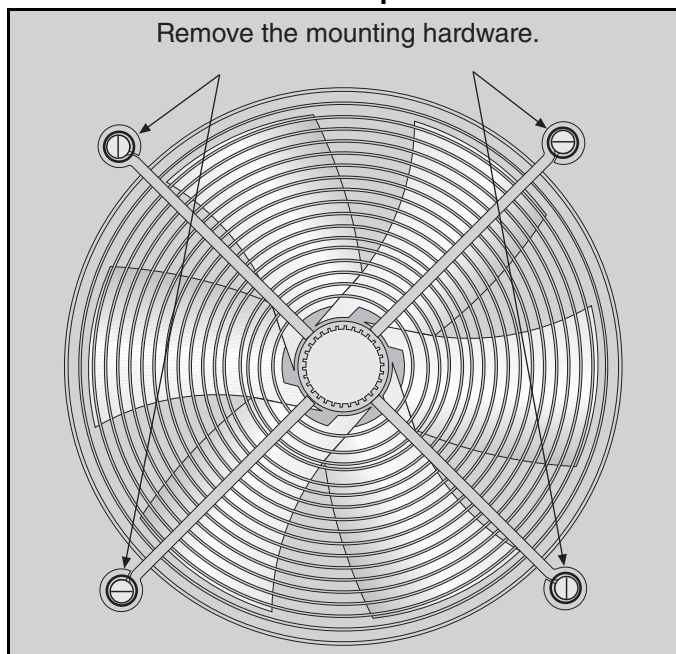
Refit in reverse. Ensure correct location of ignition cable and all other wiring.

### 14.9 Axial Fan/Guard/Motor Assembly

The axial fan unit for the heater is supplied completely assembled and balanced

MODEL	UHA[S] 150 - 175	UHA[S] 200- 250	UHA[S] 300 - 400
Axial Fan Guard	91901105	91901104	91901105
Axial Fan Motor	90600106	90600107	90600106
Axial Fan Blade	90709005	90709006	90709005

### 14.9.1 Fan Removal and Replacement



Description	Part Number	Qty.
Axial Fan UHA[S] 150 - 175	90710416	1
Axial Fan UHA[S] 200 - 250	90710417	1
Axial Fan UHA[S] 300 - 400	90710416	2

### 14.9.2 To Replace the Fan Assembly

- To replace the fan assembly, reverse the procedure shown above.
- Check that the fan blades are free to rotate before turning on the power to the fan.
- Strictly comply with the color code of the fan wires to ensure correct operation.
- See *Page 16, Section 9.3* wiring diagram.
- Use only genuine replacement parts sold and supplied by Rapid Engineering.

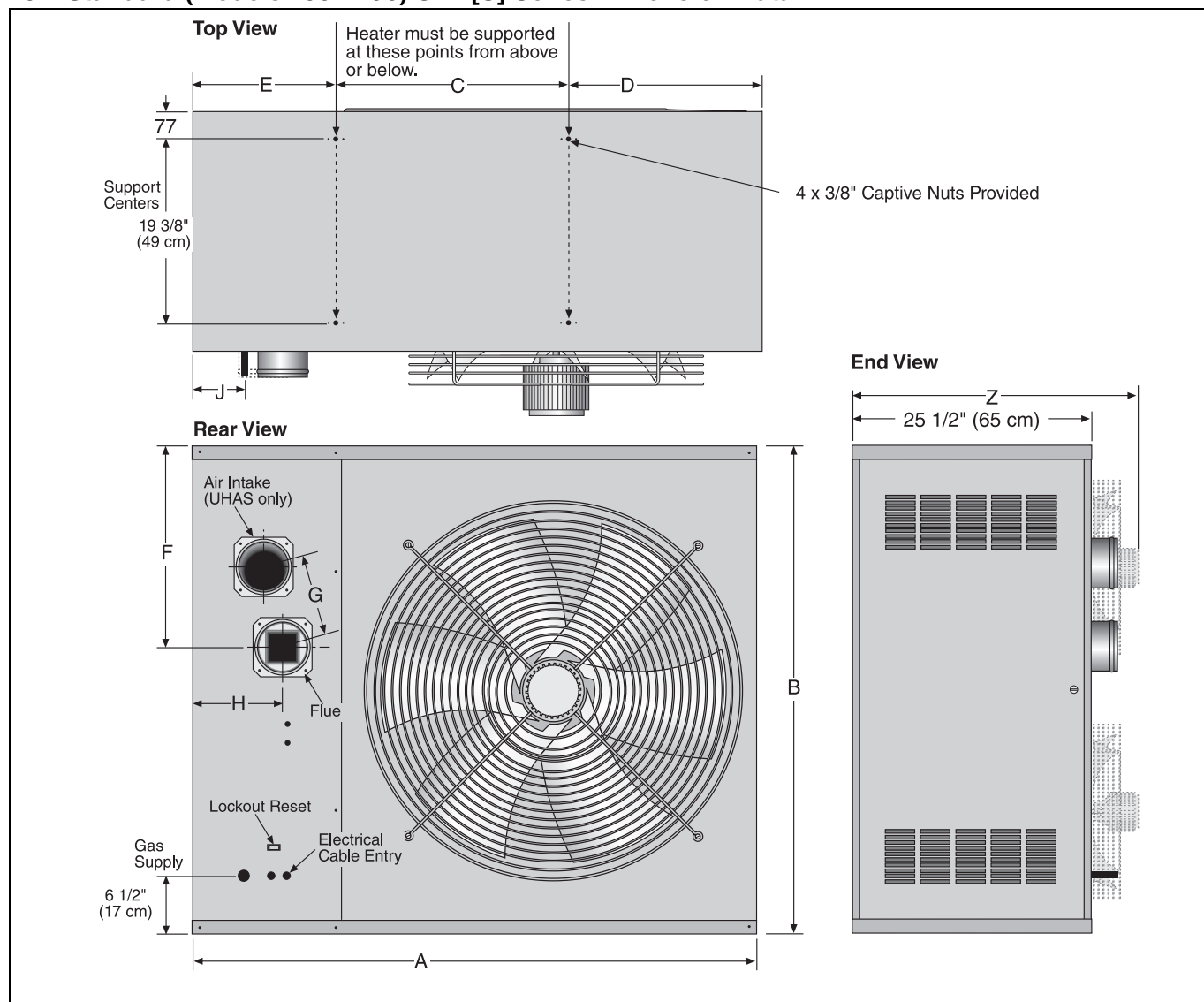
## 14.10 Limit Switches

### 14.10.1 Removal and Replacement

1. Remove the electrical connections to the switch.
2. Unscrew the two screws securing the switch.
3. Fit a new switch with two screws. See *Page 39, Section 15.3*.
4. Reconnect the electrical connections and test operation.

# SECTION 15: SPECIFICATIONS

## 15.1 Standard (Models 150 - 400) UHA[S] Series Dimension Data



		Model	UHA[S] 150	UHA[S] 175	UHA[S] 200	UHA[S] 225	UHA[S] 250	UHA[S] 300	UHA[S] 350	UHA[S] 400
A	Width	in (cm)	42.4 (108)	42.4 (108)	42.4 (108)	42.4 (108)	42.4 (108)	52.3 (133)	52.3 (133)	52.3 (133)
B	Height	in (cm)	26.9 (68)	26.9 (68)	35.2 (89)	35.2 (89)	35.2 (89)	43.5 (110)	43.5 (110)	43.5 (110)
C	Support Spacing	in (cm)	17.7 (45)	17.7 (45)	17.7 (45)	17.7 (45)	17.7 (45)	24.7 (63)	24.7 (63)	24.7 (63)
D	Support Spacing	in (cm)	12.3 (31)	12.3 (31)	12.3 (31)	12.3 (31)	12.3 (31)	12.3 (31)	12.3 (31)	12.3 (31)
E	Support Spacing	in (cm)	12.4 (32)	12.4 (32)	12.4 (32)	12.4 (32)	12.4 (32)	15.3 (39)	15.3 (39)	15.3 (39)
F	Centre of Flue	in (cm)	15.5 (39)	15.5 (39)	17.5 (44)	17.5 (44)	17.5 (44)	13.8 (35)	13.8 (35)	13.8 (35)
G	Centre of Flue/Air Intake	in (cm)	5.5 (14)	5.5 (14)	6.4 (16)	6.4 (16)	6.4 (16)	7 (18)	7 (18)	7 (18)
H	Position of Flue	in (cm)	8.2 (21)	8.2 (21)	8.8 (22)	8.8 (22)	8.8 (22)	11 (28)	11 (28)	11 (28)
J	Gas Inlet Position	in (cm)	5.8 (15)	5.8 (15)	5.8 (15)	5.8 (15)	5.8 (15)	5.8 (15)	5.8 (15)	5.8 (15)
Z	Length	in (cm)	34 (86)	34 (86)	34 (86)	34 (86)	34 (86)	34 (86)	34 (86)	34 (86)

**15.2 General Technical Data Table (All Models)**

	Model	UHA[S] 150	UHA[S] 175	UHA[S] 200	UHA[S] 225	UHA[S] 250	UHA[S] 300	UHA[S] 350	UHA[S] 400
Full Load Amps @ 115 V	A	5.8	5.8	10.6	10.6	10.6	11.6	11.6	11.6
Air Volume	CFM	2245	2245	3716	3716	3716	4663	4663	4663
<b>Flue and Air Intake</b>									
Flue Intake Size	in (cm)	4 (10)	4 (10)	4 (10)	4 (10)	4 (10)	4 (10)	4 (10)	4 (10)
Air Intake Size	in (cm)	4 (10)	4 (10)	4 (10)	4 (10)	4 (10)	5 (13)	5 (13)	5 (13)
*Maximum Straight Flue/Air Intake	ft (m)	40 (1)	40 (1)	40 (1)	40 (1)	40 (1)	40 (1)	40 (1)	40 (1)

\*Do not exceed the maximum length of flue stated or heater may not operate properly.

**15.3 Technical Data Table (All Models)**

	Model	UHA[S] 150	UHA[S] 175	UHA[S] 200	UHA[S] 225	UHA[S] 250	UHA[S] 300	UHA[S] 350	UHA[S] 400
Total Input	(Btu/h) x (1000)	150	175	200	225	250	300	350	385
Total Output	(Btu/h) x (1000)	123	143.5	164	184.5	205	246	287	315.7
Efficiency	%	82	82	82	82	82	82	82	82
<b>Natural Gas (G20) Data - Inlet Pressure 5.0 in w.c. Min., 14 in w.c. Max.</b>									
Burner Pressure	in. w.c.	3.2	3.4	3.7	3.7	4.0	2.7	2.7	3.3
<b>LPG / Propane (G31) Data -Inlet Pressure 12.0 in w.c. Min., 14 in w.c. Max.</b>									
Burner Pressure	in. w.c.	9.9	10.4	10.5	10.7	10.5	9.4	9.3	11.1



## SECTION 16: THE RAPID™ UHA-SERIES WARRANTY

### RAPID ENGINEERING WILL PAY FOR:

Within 24 months from date of purchase by buyer or 27 months from date of shipment by Rapid Engineering (whichever comes first), replacement parts will be provided free of charge for any part of the product which fails due to a manufacturing or material defect.

Rapid Engineering will require the part in question to be returned to the factory. Rapid Engineering will, at its sole discretion, repair or replace after determining the nature of the defect and disposition of part in question.

RAPID™ Replacement Parts are warranted for a period of 18 months from date of shipment from Rapid Engineering or the remaining RAPID™ UHA-Series warranty.

### RAPID ENGINEERING WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipment of replacement parts.

Claims where the total price of the goods have not been paid.

Damage due to:

- Improper installation, operation or maintenance.
- Misuse, abuse, neglect, or modification of the RAPID™ UHA-Series in any way.
- Use of the RAPID™ UHA-Series for other than its intended purpose.
- Incorrect gas or electrical supply, accident, fire, floods, acts of God, war, terrorism, or other casualty.
- Improper service, use of replacement parts or accessories not specified by Rapid Engineering.
- Failure to install or maintain the RAPID™ UHA-Series as directed in the Installation, Operation and Service manual.
- Relocation of the RAPID™ UHA-Series after initial installation
- The use of the RAPID™ UHA-Series in a corrosive atmosphere containing contaminants.
- The use of the RAPID™ UHA-Series in the vicinity of a combustible or explosive material.
- Any defect in the RAPID™ UHA-Series arising from a drawing, design, or specification supplied by or on behalf of the consumer.
- Damage incurred during shipment. Claim must be filed with carrier.

### WARRANTY IS VOID IF:

The RAPID™ UHA-Series is not installed by an electrician qualified in the installation and service of control systems for heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The ownership of the RAPID™ UHA-Series is moved or transferred. This warranty is nontransferable.

Rapid Engineering is not permitted to inspect the damaged controller and/or component parts.

## READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL

If you have questions about your controller, contact your installing professional. Should you need Replacement Parts or have additional questions, call or write Rapid Engineering:

### U.S.A.

1100 Seven Mile Road, NW

Comstock Park, MI 49321

616.784.0500

**On the web at:** [www.rapidengineering.com](http://www.rapidengineering.com)

**Rapid Engineering's liability, and your exclusive remedy, under this warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this warranty.** Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this warranty.

**Rapid Engineering shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the RAPID™ UHA-Series.** Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

RAPID™ UHA-Series shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to war, fire, flood, strike, government or court orders, acts of God, terrorism, unavailability of supplies, parts or power. No person is authorized to assume for Rapid Engineering any other warranty, obligation or liability.

### LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Rapid Engineering, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Rapid Engineering's duly authorized Executive Officer.







## OWNER WARRANTY REGISTRATION CARD

### Mail or Fax to:

Rapid Engineering • 1100 Seven Mile Road NW • Comstock Park, MI 49321 • Phone: 616-784-0500 • Fax: 616-784-1910  
Toll Free: 800-536-3461 • [www.rapidengineering.com](http://www.rapidengineering.com)

### About the Owner:

Name: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

### About the Installer:

Name: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

### Purchased From (if different than installer):

Name: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

### About your Heater:

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_ Fuel: \_\_\_\_\_ Installation Date: \_\_\_\_\_

### Type of Installation (check one):

☐ Automotive      ☐ Manufacturing      ☐ Warehouse      ☐ Recreational      ☐ Aircraft  
☐ Public Building      ☐ Office      ☐ Retail      ☐ Agricultural      ☐ Other \_\_\_\_\_  
-----

**Installation Code and Annual Inspections:** All installations and service of RAPID™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Rapid Engineering and conform to all requirements set forth in the RAPID™ manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment.

To help facilitate optimum performance and safety, Rapid Engineering recommends that a qualified contractor annually inspect your RAPID™ equipment and perform service where necessary, using only replacement parts sold and supplied by Rapid Engineering.

**These products are not approved for residential use, except for models UHA[S] 30 - UHA[S] 75.**

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Attach this information to the wall near the RAPID™ heater.



Read the Installation, Operation and Service Manual thoroughly before installation, operation or service.

#### OPERATING INSTRUCTIONS

1. STOP! Read all safety instructions on this information sheet.
2. Open the manual gas valve in the heater supply line.
3. Turn on electric power to the heater.
4. Set the thermostat to desired setting (above ambient temperature).  
The automatic starting sequence begins.

#### TO TURN OFF THE HEATER

1. Turn the thermostat/time switch to 'OFF' or lowest setting. The burner will turn 'OFF' immediately, but fans will continue to cool heat exchanger until the fan thermostat switches off.

#### IF THE HEATER WILL NOT OPERATE, TO ENSURE YOUR SAFETY, FOLLOW THESE INSTRUCTIONS TO SHUT DOWN YOUR HEATER

1. Set the thermostat to off or the lowest setting.
2. Turn off electric power to the heater.
3. Turn off the manual gas valve in the heater supply line.
4. Call your installer/contractor qualified in the installation and service of gas-fired heating equipment.

## ⚠ WARNING



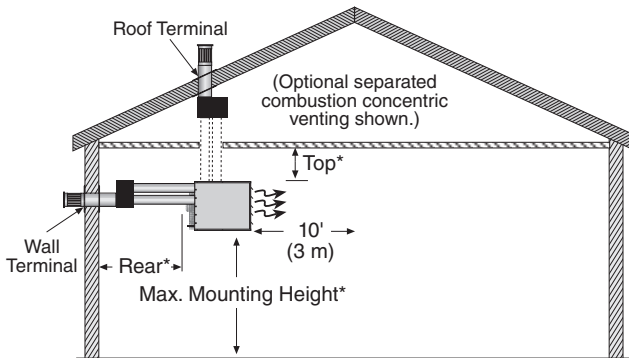
### Fire Hazard

Some objects can catch fire or explode when placed close to heater.

Keep all flammable objects, liquids and vapors the required clearances to combustibles away from heater.

Failure to follow these instructions can result in death, injury or property damage.

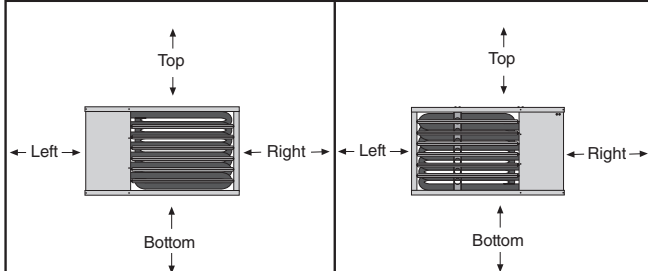
#### Installation Clearances



*Models	30 - 125	150 - 400
Top	1" (2.5 cm)	6" (15 cm)
Rear	18" (46 cm)	24" (61 cm)
Max Mounting Height <sup>1</sup>	12' (3.7 m) - 20' (6 m)	20' (6 m) - 30' (9 m)

<sup>1</sup>Heaters can be mounted higher if destratification fans are installed. See Installation, Operation and Service Manual for specific mounting height recommendations.  
NOTE: Venting directly from top of heater not applicable on Models 150-400.

#### Clearances to Combustibles



#### Models 30 - 125

#### Models 150 - 400

Models	30 - 125	150 - 400
Top	1" (2.5 cm)	6" (15 cm)
Bottom	0" (0 cm)	3" (8 cm)
Right	1" (2.5 cm)	31" (79 cm)*
Left	18" (46 cm)*	6" (15 cm)
Vent	2" (5 cm)	2" (5 cm)

\* Clearance needed for servicing.

**Rapid Engineering**  
1100 Seven Mile Road N.W.  
Comstock Park, MI 49321

Telephone: 616.784.0500  
Fax: 616.784.1910  
Toll Free: 800.536.3461

#### Installation Code and Annual Inspections:

All installations and service of RAPID™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Rapid Engineering and conform to all requirements set forth in the RAPID™ manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment. To help facilitate optimum performance and safety, Rapid Engineering recommends that a qualified contractor annually inspect your RAPID™ equipment and perform service where necessary, using only replacement parts sold and supplied by Rapid Engineering.

For installations at elevations above 2000' (610 m), the appliance shall be derated 4% for each 1000' (305 m) of elevation above sea level.

**Further Information:** Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through Rapid Engineering representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.

**Models 100-400 are not for residential use.**